



Investment Practices and Performance Evaluation of the Teacher Retirement System of Texas

March 30, 2020

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Background



Background

Effective June 10, 2019, Texas Government Code §802.109 requires that all Texas public retirement systems with at least \$30 million in assets complete an Investment Practices and Performance Evaluation (“Evaluation”). The scope of the Evaluation is defined in Texas Government Code § 802.109 and is supplemented by guidance from the Texas Pension Review Board (“PRB”), dated September 20, 2019.

The Evaluation must focus on the following five areas: (1) the investment policy; (2) the asset allocation; (3) the appropriateness of investment fees and commissions; (4) governance processes for investment activities; and (5) the investment manager selection and monitoring processes.

Retirement systems with at least \$100 million in total assets must conduct the Evaluation once every three years. Retirement systems having at least \$30 million but less than \$100 million in total assets must complete the Evaluation once every six years.

A report of the Evaluation must be filed with the governing body of the public retirement system no later than May 1 of each year following the year in which the system is evaluated. The governing body must submit the report of the Evaluation to PRB no later than 31 days after the date the governing body of the retirement system receives the report.

The Evaluation must be completed by an independent firm with substantial experience in evaluating institutional investment practices and performance. The independent firm is required to evaluate the appropriateness, adequacy, and effectiveness of the retirement system’s investment practices and performance and to make recommendations for improving the investment policies, procedures, and practices.

Aon Hewitt Investment Consulting Inc. (“AHIC”) is currently providing investment consulting services to the Teacher Retirement System of Texas (“TRS”) pursuant to the September 1, 2018 Investment Advisory Services Agreement. A separate group within AHIC (“Fiduciary Services Practice”) is providing this Evaluation at TRS’ request pursuant to the January 24, 2020 Amendment 2 to the September 1, 2018 Investment Advisory Services Agreement.

AHIC is a full-service global investment consulting firm that provides a wide array of services to various client types. AHIC has a dedicated Fiduciary Services Practice that has extensive experience conducting fiduciary audits and investment governance reviews similar in scope to the Evaluation mandated by Texas Government Code §802.109. AHIC’s Fiduciary Services Practice has prepared this Evaluation.

Texas Government Code §802.109(c)(1) and (2) provides that the public retirement system may select a firm regardless of whether the firm has an existing relationship with the retirement system but may not select a firm that directly or indirectly manages investments of the system. AHIC meets the statutory definition as an independent firm. AHIC and any related entities are not involved in directly or indirectly managing the investments of TRS.

Methodology and Evaluation Format

The development of this Evaluation is consistent with the AHIC methodology used for comparable reviews it has performed. This methodology included an initial project “meeting of the minds” conference call between AHIC and TRS staff to establish expectations, deliverables, team assignments, designated liaisons from TRS and AHIC, and communication protocols.

AHIC provided an extensive document request to TRS covering the 5 statutorily required component task areas. TRS provided numerous items in response to the document request. Those items are listed in Appendix A-Documents Reviewed. AHIC also conducted interviews with key TRS staff and Board Members as listed in Appendix B. AHIC performed research, analysis, and report drafting. AHIC submitted draft versions of the report for TRS staff review and feedback and had follow up discussions with TRS staff. The final Evaluation addressed staff comments and added additional clarity and information in response. The final Evaluation, however, reflects the independent work and professional judgement of AHIC staff.

This Evaluation question and answer format is modeled after the September 20, 2019 guidance issued by the PRB. We incorporated virtually all the suggested PRB questions and although some areas may be repetitive, we found it best to follow the PRB guidance, particularly as this is the first statutorily required Evaluation.

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Executive Summary



Executive Summary

General Overview

Our report evaluates all the key areas outlined in the Texas Government Code §802.109, following the format and questions included in the PRB guidance. Through our review we have evaluated the 5 evaluation components (outlined and summarized below), and we have found that the Teacher Retirement System of Texas (“Plan”) is performing in a manner consistent with best in class peers. Our review included an evaluation of all the items outlined in the PRB guidance, and the system is performing nearly all of the many functions inquired about within the guidance. During our review we have found;

1. The Investment Policy Statement (“IPS”) is comprehensive and follows best practice, it contains appropriate measurable outcomes, and it is being followed
2. The Plan has a leading-edge practice for developing asset allocation, assets are well diversified, and risk is being measured and managed appropriately
3. Fees are appropriately reported to the Board through multiple annual processes. The Total fee is slightly higher than peer institutions, and this is primarily due to the Plan’s higher use of active management and external private managers
4. The structure and breadth of the investment decision-making governance process is in line with best practices, with clearly delineated roles and responsibilities, monitoring, reporting, transparency, and frequent compliance testing and assurance
5. The manager selection process is well defined and robust. Returns are calculated by the Plan’s custodian, and all performance is reported net of external investment management fees

Evaluation Component 1: Investment Policy or Strategic Investment Plan and Associated Compliance

The Plan has an IPS document that was last reviewed in September of 2019 and is reviewed on a biennial basis. The document provides a thorough, yet succinct overview of the roles and responsibilities for each applicable group associated with investment decisions and oversight. The TRS IPS document is quite comprehensive. Overall, we think the level of detail and the readability of the document is appropriate given the context of TRS – that of a large and sophisticated institutional investor. Additionally, based on our review we believe the IPS follows best practice.

Based on our review of the meeting minutes, board reports, and interviews, we believe the IPS and other policies are being followed. Additionally, TRS has an independent compliance team which performs ongoing oversight to ensure that the IPS is being followed.

The IPS contains measurable outcomes for the Plan as well as the underlying asset classes. The document contains measurable risk/return outcomes for investment managers. As detailed in the report, the Plan has been successful in meeting its stated objectives over the trailing 10-year period. Additionally, the current policy would have provided desirable returns relative to the stated performance objectives if it were implemented 20 years ago.

Evaluation Component 2: Investment Asset Allocation

The Board articulates a process for how they will determine and evaluate the asset allocation of the Plan within the IPS (occurring every 5 years). Based on our review of the most recent

evaluation they are following this process. The strategic asset allocation development process (which includes asset liability analysis and stress testing) occurring in practice is robust, and we believe represents a leading-edge practice.

The system's overall risk tolerance is expressed and measured in many ways. The Board's predominant expression of risk tolerance is the selection of the long-term strategic asset allocation. The Board has determined that this allocation represents the appropriate risk positioning to achieve the objectives of the Plan over time. That risk positioning is managed through the Plan's tracking error targets and asset allocation ranges, which have been adopted within the Plan's IPS.

The Board's investment consultant and actuary communicate regarding their respective future return expectations. The process for deriving the strategic asset allocation of the Plan considers the actuarial discount rate, and the ability to achieve that assumption through the returns offered in the capital markets. The actuarial discount rate is a part of the mosaic of information considered by the Board when selecting the strategic allocation that will most efficiently allow the Plan to meet its obligations.

The Plan has less equity and fixed income than the median peer, with a higher allocation to alternatives (private equity, risk parity, hedge funds, and energy, natural resources and infrastructure) and real estate. The assets of the Plan are well diversified with modest use of passive management. The report details the asset allocation of the Plan relative to peers, the long-term strategic target, and provides the projected risk and return of the Plan and each invested asset class.

We believe the process to determine the asset allocation of the Plan is robust, and there is nothing in our analysis that would position us to say that a different asset allocation would be better positioned to meet the investment return and risk objectives of the Plan. Additionally, we believe the size of TRS, the duration of its liabilities, the depth of the Investment Management Division ("IMD"), and the support of the Board give it a competitive advantage in achieving alpha in the alternative investment space. We believe the system's alternative investments are appropriate given its size and level of investment expertise.

Evaluation Component 3: Investment Fees and Commissions

The Plan dedicates the appropriate amount of review and reporting on investment fees and commissions. The Plan does not have a written policy with regards to rules for fee negotiations. Based on our conversations with IMD this is due to the unique nature of each investment and how fees are structured and negotiated. IMD stressed during our interactions that they strive for the lowest fees possible with each investment opportunity. A written policy on rules for fee negotiations is uncommon across peer institutional investors.

IMD maintains procedures for the payment of management and incentive fees. The procedure document outlines the process for receiving, reconciling, paying, and documenting the payment of management and incentive fees. The investment fees and commissions paid by the system include management fees, performance-based fees, carried interest, and broker commissions. These fees are outlined within the Plan's Comprehensive Annual Financial Report ("CAFR") in the Investment Section. The IMD operating expenses are included in the CAFR Statement of Changes in Fiduciary Net Position and also reported annually to the Board as part of the annual budget review and approval process.

Fees are reported to the Board in multiple ways, including its Annual Budget Exercise, Investment Cost Effectiveness Analysis survey ("CEM Benchmarking Report"), monthly

Transparency reports, the annual CAFR, and as part of the annual audit. The CEM Benchmarking Report is the industry standard for objective fee benchmarking relative to peer institutions. The December 31, 2018 report found that the investment costs of the Plan were slightly higher (0.038%) than the CEM benchmarked costs. The benchmark cost developed by CEM represents the median cost of peers of each underlying invested asset class weighted to reflect the Plan's actual asset allocation.

Evaluation Component 4: Investment Governance Processes

Overall, we found TRS to have extensive and detailed documentation of its governance related to the investment-decision making process. The IPS and Board Bylaws are detailed and follow best practices by clearly articulating roles and responsibilities and clarity regarding what authority has been retained by the Board and what has been delegated. We determined that the level of delegation from the Board is in line with its peers and best practices, given the size and complexity of the Plan.

We found TRS to be leading-edge in terms of its transparency, exceeding that of many public retirement systems. In addition to posting the IPS and Board Bylaws on the TRS website, stakeholders also have access to dedicated web-pages outlining IMD teams, Investment Strategy, Beliefs, Diversification Framework, Risk Management, and Making and Managing Investments. The website also has information for stakeholders regarding Board meetings, with highly detailed board minutes, web broadcasting of open portions of Board and Committee meetings, Board packets back to 2013, Trustee biographies, listing of Board Committees and Officers, Board of Trustee Ethics Policy, Board of Trustees External Communication Policy, and Board Meeting calendar.

The makeup of the Board includes a requirement that certain appointed members have demonstrated financial expertise, who have worked in private business or industry, and who have broad investment experience, preferably in the investment of funds. The onboarding training provided to new Trustee is in line with best practices and covers a multitude of topics. The Trustees have continual training and education provided by a variety of sources, including annual fiduciary training and ongoing investment education. We found that Trustees clearly understand and embrace their fiduciary responsibilities and have properly engaged outside Advisors to assist them in their decision-making process.

We believe the governance structure is in line with best practices of a fund the size and complexity of TRS. The Board establishes policy and ensures appropriate monitoring, reporting, accountability, and compliance with its policies. Staff is able to appropriately implement the Board's directives within the parameters set by the Board. The policies, procedures, practices, and interviewees' commentaries all support a strong, stable governance framework for TRS to fulfill its mission and purpose.

Evaluation Component 5: Investment Manager Selection and Monitoring Processes

It is ultimately the responsibility of IMD to review, consider, and authorize proposed investments and external manager selection (within the guidelines set forth in the Plan's IPS). For public market, private market, and risk parity candidates, teams will utilize all their available resources to come up with a list of potential managers that warrant further due diligence. Examples of these resources include discussions with existing managers, outreach from managers not currently invested with, opportunities learned through discussion with industry professionals or at industry conferences, and outside resources such as eVestment/PitchBook/etc. or investment consultants/advisors.

The process for further screening the list of potential managers is robust and is outlined in detail within the report (as well as ongoing diligence and the process of termination). A legal review is performed on potential managers, and this review evaluates ethical considerations and potential conflicts of interest for both investment managers and Board members. Final selection between qualified candidates is often the result of what mandate most efficiently provides the exposure desired and represents the best fit within the Plan. Internal legal counsel, under the direction of TRS General Counsel, reviews all manager/investment consultant and/or advisor contracts for terms in the best interests of TRS. The internal legal team also uses and manages external legal counsel.

The Plan's custodian (State Street) is responsible for measuring and calculating investment performance. The types of performance reports provided to the Board are many and have been outlined in the report. We believe that the reports are appropriately formatted and presented to allow Board members of all investment acumen and expertise to evaluate the investment success associated with the implementation of the investment policy.

Investment management fees are considered when reviewing investment performance. All investment results reported to the Board by the investment consultant and IMD are net of external investment management fees and gross of the IMD Operating Budget (this is consistent with peers). The CEM Benchmarking Report provides a thorough review of the investment expenses of the Plan as well as the net of fee investment results of the Plan relative to peers.

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Evaluation Component 1.



Evaluation Component 1

An analysis of any investment policy or strategic investment plan adopted by the retirement system and the retirement system's compliance with that policy or plan;

- ***Does the system have a written investment policy statement (IPS)?***

Conclusions

The Teacher Retirement System of Texas has an IPS document. This document was last reviewed in September of 2019.

- ***Are the roles and responsibilities of those involved in investing decisions clearly outlined?***

Background

The IPS includes section 1.3 (Roles of Board, Staff, Advisors, and Consultants). This section of the document outlines the roles and responsibilities of the;

1. Board of Trustees ("Board")
2. Board's investment advisors ("Advisor")
3. Investment Management Division ("IMD")
4. Internal Investment Committee ("IIC")
5. Chief Investment Officer ("CIO")
6. Executive Director
7. Legal staff

Conclusions

Section 1.3 of the IPS provides a thorough, yet succinct overview of the roles and responsibilities for each applicable group associated with investment decisions and oversight in a level of detail that is appropriate for an investment policy statement. Roles are also further defined throughout the document.

- ***Is the policy carefully designed to meet the real needs and objectives of the retirement plan? Is it integrated with any existing funding or benefit policies? (i.e. does the policy take into account the current funded status of the plan, the specific liquidity needs associated with the difference between expected short-term inflows and outflows, the underlying nature of the liabilities being supported [e.g. pay-based vs. flat \$ benefit, automatic COLAs, DROP, etc.]).***

Background

The ongoing creation and review of the IPS for the Plan is quite robust. The Board reviews the TRS IPS on a recurring basis. The purpose of such reviews is to ensure the document is designed to meet the real needs and objectives of the Plan. The IPS provides the means for the Board to control various critical aspects of the investment portfolio, including: long-term asset allocation, rebalancing ranges, monitoring and reporting practices, risk limits, governance practices, investment delegation, and benchmarks. The document also allows the Board to memorialize the processes it undertakes to ensure the Plan is designed to meet its objectives.

Broadly speaking all components of the IPS are intended to assist the Plan in meeting its objectives. However, two of the most impactful ways in which this is occurring include;

- Documentation of the long-term strategic asset allocation target resulting from the asset allocation and asset liability review (“Asset Allocation Study”)
- Documentation of the Liquidity Risk Management policy to ensure sufficient liquidity to meet the disbursement of benefits and related obligations to plan participants, and meet the ongoing liquidity needs required to appropriately manage the portfolio

Funding Policy

TRS maintains a funding policy which was approved by the Board in December of 2019. The purpose outlined in the document is to systemically decrease the unfunded actuarial accrued liability (“UAAL”) over time to achieve a funded ratio of the system that is equal to or greater than 100 percent.

The 86th Texas Legislature authorized contribution rate increases (for the State, employers, and members) that will be phased-in through 2024. State contribution rates are requested in the agency’s biennial Legislative Appropriation Request (“LAR”). Legislative appropriation requests are made by the Executive Director, in consultation with the Board.

After the phase-in of currently scheduled contribution rate increases, the Executive Director, in consultation with the Board and based on the current annual actuarial valuation, will determine the appropriate contribution rate to request in the LAR. If the annual valuation projects that the UAAL will not begin to decline by the fifth year following the valuation, then TRS will request contribution rate increases sufficient to begin to reduce the UAAL.

Conclusions

The TRS IPS document is quite comprehensive. Overall, we think the level of detail in the document is appropriate given the context of TRS – that of a large and sophisticated institutional investor. We believe the policy has been carefully designed to meet the real needs and objectives of the retirement plan. Additionally, we believe the Funding Policy accurately articulates the goals set forth by the Texas Government Code, and outlines the process and scenario required for TRS to prepare a legislative appropriation request to increase contribution rates, based on eliminating the unfunded actuarial accrued liability over time.

- ***Is the policy written so clearly and explicitly that anyone could manage a portfolio and conform to the desired intentions?***

Conclusions

We believe the level of detail in the document is appropriate given the context of TRS – that of a large and sophisticated institutional investor. Given that context, there is a level of investment and governance knowledge that would be required for an individual to manage the portfolio and conform to the desired intentions. We do not believe the individual would require background knowledge of TRS to serve in this role. Given the sophistication of the investment program, we believe the IPS document is written clearly and explicitly.

- ***Does the policy follow industry best practices? If not, what are the differences?***

Background

There is no uniform standard for the content and no absolute model to follow when drafting an IPS. The IPS should ideally be a highly customized document that is uniquely tailored to the preferences, goals, and situation of the plan. At TRS, the Board reviews the IPS on a recurring basis. The purpose of such reviews is to ensure the document reflects desired long-term asset allocation, the evolving investment portfolio, legal and regulatory developments, current best practices, and that it reflects input from relevant parties. These reviews are led by IMD, and they worked closely with other departments within TRS Legal & Compliance and Internal Audit. Feedback and input is also solicited from external fiduciary counsel, the Board's actuary, and the Board's Advisors.

To facilitate our review of the IPS, we have included a table outlining what we believe to be the key sections of an IPS and how we think about IPS development. The table includes a broad title of each section type, the type of information we expect to be included in each section, and a checkmark representing the inclusion of this type of information within the Policy. As shown in the table, the IPS includes all components that we believe a well-structured IPS should have, and we do not have any recommended additions.

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Section	Purpose of Section	Included In TRS IPS
Introduction	- Reference to the purpose and benefit to be provided by the Trust.	√
	- Intended beneficiaries of the Trust.	√
	- Overview of fiduciary obligation.	√
Statement of Purpose	- Investments made for the exclusive purpose of providing benefits to participants.	√
	- Plan fiduciaries must act in the sole interest of plan participants and beneficiaries and for the exclusive purpose of providing benefits.	√
Investment Goals or Objectives	- To preserve the actuarial soundness of the Trust in order to meet benefit obligations.	√
	- To obtain a long-term rate of return, net of fees, equal to or in excess of the policy benchmark.	√
	- The policy benchmark and asset allocation targets should be defined.	√
Asset Allocation	- Purpose is to provide an optimal mix of investments to produce desired returns and meet current and future liabilities, with minimal volatility.	√
	- Frequency and methodology of asset liability modeling and resetting allocation.	√
	- Describe permissible asset classes as well as minimum, maximum, and target ranges.	√
Identification of Roles and Responsibility	- Board of Trustees – general and investment related duties.	√
	- External investment consultants/advisors – advise on best practices, trends and support staff and Board/Investment Advisory Committee with fiduciary responsibilities.	√
	- Other external providers’ duties, expectations and fiduciary responsibilities.	√
Asset Class Guidelines / Benchmarks	- Benchmarks – who sets them and how often they are revisited, and their rationale.	√
	- Diversification - Provide an overview on the importance of diversification and how it is achieved in the Trust.	√
Rebalancing Policy	- Purpose of rebalancing – to ensure that the investment program adheres to its strategic asset allocation.	√
	- Describe how often the portfolio will be reviewed for rebalancing and whether a fixed threshold or proportional threshold will be used.	√
Risk Management	- Acknowledgement and definition of risk to be managed in investment portfolio (active risk, credit risk, counterparty risk, market risk, operational risk, etc.)	√
	- Define parameters for risk management (what does success look like).	√
Monitoring and Reporting	- Describe monthly, quarterly and annual reporting.	√
	- Outline monitoring and reporting process.	√
Shareholder Activity	- Proxy positions – describe the policy and how votes are cast and recorded, or reference appropriate policy.	√
	- Identify core principals of the Board (Board independence, Board management, shareholder rights) and communicate importance of fiduciary duty, integrity, and transparency.	√
Governance	- Identify obligations to the Trust are consistent with the fiduciary standards under applicable law.	√
	- Require ongoing review of investment policy statement.	√

Conclusions

The IPS follows best practice. While there is no uniform standard for the content and no absolute model to follow when drafting an IPS, we do maintain a table for what we believe an IPS should include to be considered best practice. The TRS IPS includes sufficient detail on all items we desire in a well-structured IPS.

- ***Does the IPS contain measurable outcomes for managers? Does the IPS outline over what time periods performance is to be considered?***

Background

The IPS contains a process for how active risk (risk/return profile relative to the benchmark) outcomes for public asset class managers will be measured and monitored within the Market Risk Management section of the document. The tracking error relative to the benchmark of each public asset class manager is monitored on an ongoing basis to ensure that the outcome for each mandate is in-line with expectations.

Benchmarks for each investment mandate are not articulated within the IPS, but are defined within the investment management agreements, and benchmarks are included in the performance presentations (transparency reports) provided to the Board on a quarterly basis.

Additionally, the IPS outlines measurable outcomes for the Plan, public market portfolio, private equity portfolio (“PE”), real estate portfolio (“RE”), energy, natural resources and infrastructure portfolio (“ENRI”), and overlay portfolio.

Total Portfolio Objectives

The IPS states that the Plan and the underlying asset class components will be evaluated (net of investment management fees) against the primary benchmark over the “long-term”. The “long-term” is defined within the policy as 3, 5, and 10 years.

Public Markets Objectives

The measurable outcome expressed with regards to the public markets portfolio is to exceed the performance of the relevant benchmarks or to manage the asset allocation and risk of the Plan.

Private Equity Objectives

The measurable outcome expressed with regards to the PE Portfolio is to develop a prudently diversified portfolio of investments that is expected to enhance the overall risk-return profile of the Plan.

Prudently diversified refers to diversification by strategy, geography, industry sectors, size of investment, and vintage year.

Real Estate Objectives

The measurable outcome expressed with regards to the RE portfolio is to contribute favorably to diversification of the Plan and provide returns through capital appreciation.

The portfolio will be evaluated for diversification by evaluating exposures by strategy, geography, property types, size of investment, vintage year, and the number of funds or investment managers represented in the portfolio.

Energy, Natural Resources and Infrastructure Objectives

The measurable outcome expressed with regards to the ENRI portfolio is to contribute favorably to diversification of the Plan by investing in assets with inflation sensitivity and provide returns through capital appreciation.

The portfolio will be evaluated for diversification by evaluating general inflation sensitivity, expected return, strategy, geography, resource exposure, size of investment, vintage year, strategy, and manager diversification.

Overlay Objectives

The measurable outcome expressed with regards to the overlay portfolios are to manage risk, asset allocation, and market exposures through futures, options, swap contracts, or forward agreements.

Conclusions

The IPS contains measurable risk/return outcomes relative to their benchmarks (active risk) for public asset class managers. Additionally, performance benchmarks for each manager are articulated in their investment management agreement and detailed in the monthly performance provided to the Board (transparency report). Additionally, the IPS outlines measurable outcomes for the Plan, public market portfolio, PE portfolio, RE portfolio, ENRI portfolio, and overlay portfolio.

- ***Is the system following the investment policy?***

Conclusions

Yes. Based on our review of the meeting minutes, board reports and interviews, we believe the IPS and other policies are being followed. Additionally, the independent compliance team performs ongoing oversight to ensure that the IPS is being followed.

- ***What practices are being followed that are not in, or are counter to, written investment policies and procedures?***

Conclusions

The written investment policies of the Plan are robust and sufficiently detailed. While there are not meaningful practices being followed that are not in the investment policies, the complexity of the investment program makes outlining every process difficult. One process being followed that is not currently included within the IPS includes the initial review of new internally managed investment strategies. In practice, these strategies are reviewed by the IIC, but this is not currently documented in the IPS. We understand that this modification is currently being evaluated for the IPS. Additionally, there are processes and practices that are occurring more rigorously than outlined in the IPS. Two noteworthy practices include the ongoing review of investment related policies and the concerted effort to drive the investment industry towards increased transparency and reduced investment management fees.

The IPS document notes that it shall be reviewed at least once every three years. However, over the last few years the IPS was reviewed in 2019, 2018, and 2016. Additionally, the ancillary policies (Commission Credits Policy, Proxy Voting Policy, and Securities Lending Policy) have each been reviewed multiple times over the same time period.

- ***Are stated investment objectives being met?***

Background

The IPS outlines two primary objectives in the “Total Fund Objectives” section. These include;

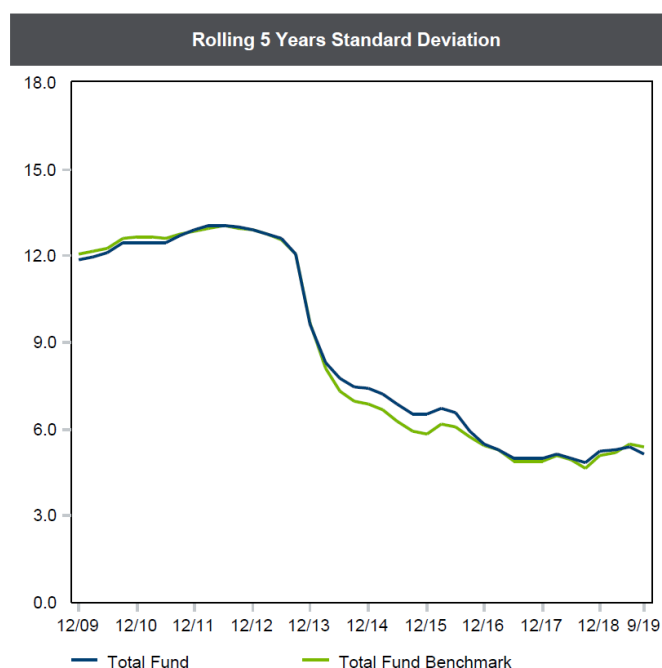
1. **Control Risk** – Properly diversify assets to control investment risk
2. **Achieve Return Targets** – Produce investment results that exceed;
 - The Actuarial Rate - Exceed the assumed actuarial rate of return adopted by the Board
 - Real Return Target - Exceeds the long-term rate of inflation by an annualized 5%
 - Plan benchmark - Exceeds the return of the Plan benchmark

Each of these objectives can be evaluated independently. The following paragraphs evaluate each objective, and if it has been met.

Control Risk

Of the criteria outlined in the IPS, this is the most difficult to evaluate. The term risk, and how it should be evaluated, can be interpreted differently by different people. We believe the standard deviation or volatility of a portfolio is a good representation of risk and have used it below to evaluate the success of risk control. References to risk in the remaining components of this response will be referring to standard deviation.

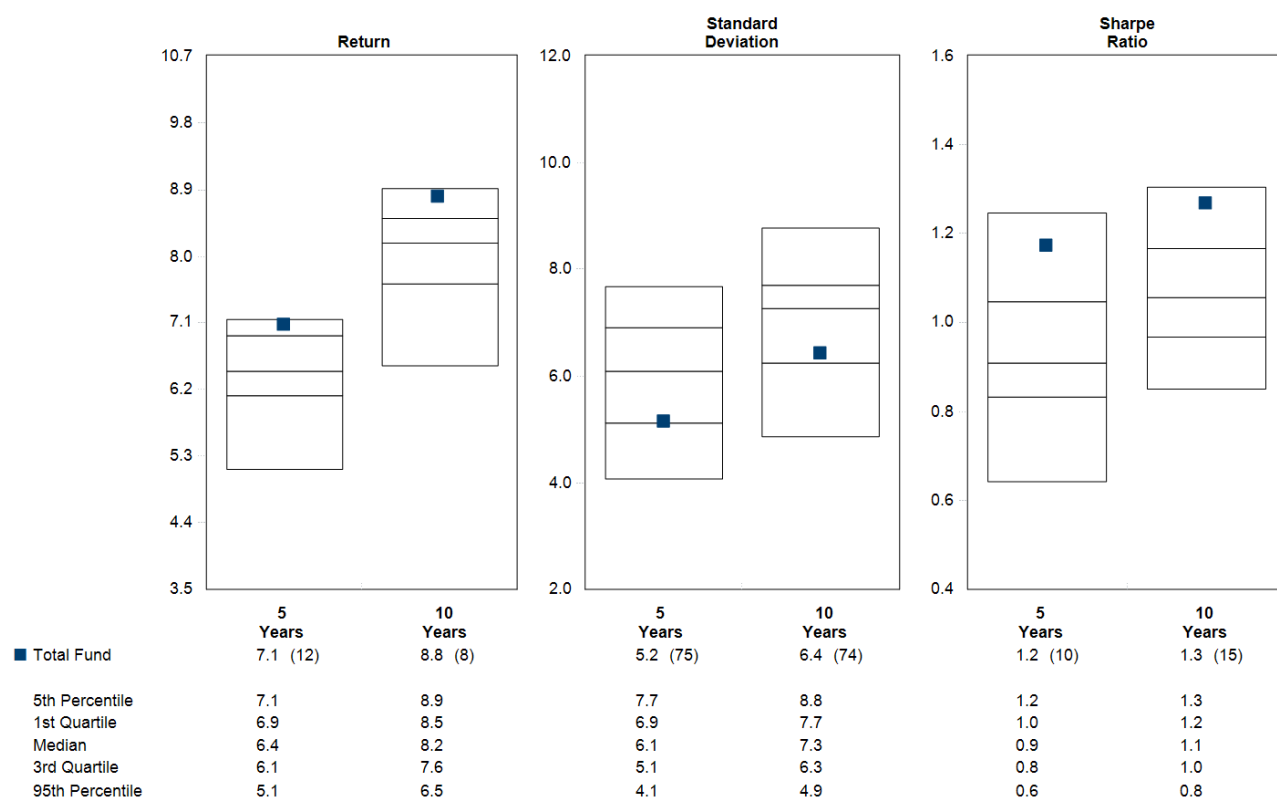
One of the most important decisions made by the Board is to establish the long-term asset allocation and risk profile of the investment program. An effective way of monitoring risk control is evaluating the rolling risk of the Plan relative to the benchmark. The chart below shows the rolling 5-year standard deviation of the Plan (blue line) relative to the benchmark (green line). As shown, the Plan has approximated the risk profile of the Board approved benchmark over time, and that risk is being generally managed to the level approved by the Board.



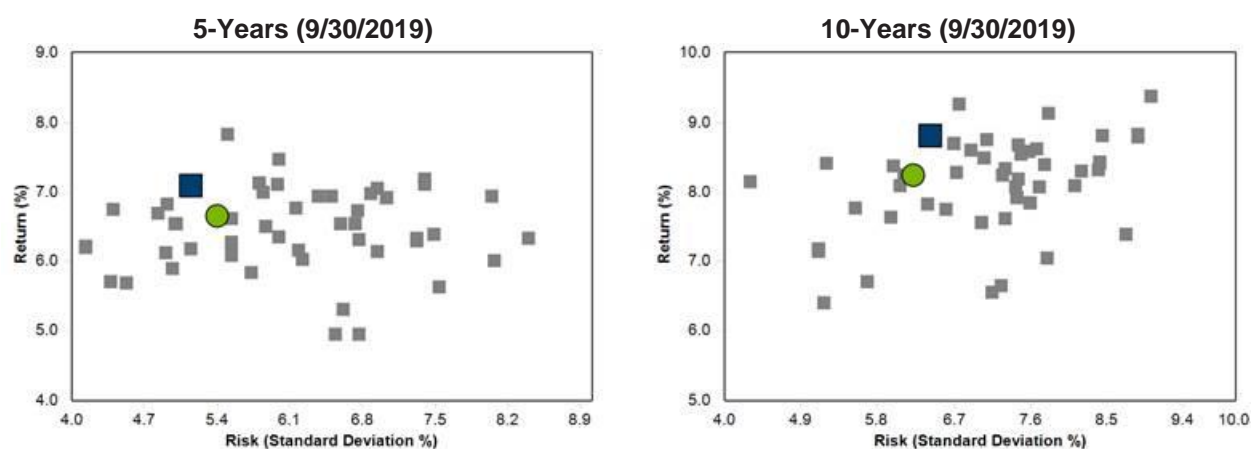
The charts below outline the return, standard deviation, and Sharpe ratio (common measure of return achieved for each unit of risk taken) of the Plan relative to a peer universe (56 peer public pension plans with assets greater than \$10 billion dollars) over the trailing 5 and 10-year periods. The rankings relative to peers are shown within the parenthesis (ranging from 1st-100th percentile). For return and Sharpe ratio a low percentile ranking represents superior outcomes,

where a high percentile ranking is desirable for risk (lower level of risk).

As shown, the Plan has produced a return approximating the top decile of peer public funds with a risk level (volatility) in line with the bottom quartile. This has produced a Sharpe ratio over those trailing time periods that represent the 10th and 15th percentile over the trailing 5 and 10-years, respectively.



The next two charts represent the risk return profile of the Plan (blue square) relative to its benchmark (green circle) and peer public pension funds (small grey dots) over 5 and 10-years. The bottom left corner represents low risk and low return. The top right corner represents high risk and high return. Therefore, the top left corner is preferred (higher return with lower risk). As shown, the results of the Plan appear be superior as they are above and to the left of the trendline represented by peers.



Achieve Return Targets – The Actuarial Rate

The current actuarial rate of return of the Plan is 7.25%. However, the actuarial discount rate changes over time based on changes to the asset allocation of the investment program as well as changes in the forward-looking capital market assumptions of the actuary and the industry as a whole. In 1975 the actuarial discount rate was as low as 5%. That rate increased over time and reached 8% in 1986. The 8% discount rate was maintained through 2017 and reduced to the current rate of 7.25% in 2018. The table below shows the return of the Plan relative to the discount rate over time, the current discount rate, and the highest discount rate during the period (8%). As shown, the Plan has performed well relative to the actuarial discount rate over last 10 years but has underperformed the rate over the 15 and 20-year periods.

As of September 30, 2019	Annualized Investment Returns (net of fee)					
	3 Years	5 Years	7 Years	10 Year	15 Years	20 Years
TRS	8.7%	7.1%	8.1%	8.8%	7.2%	6.3%
Discount Rate over Time	7.4%	7.7%	7.8%	7.8%	7.9%	7.9%
Current Discount Rate	7.3%	7.3%	7.3%	7.3%	7.3%	7.3%
Highest Discount Rate	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%

Achieve Return Targets – Real Return Target (CPI + 5%)

The table below outlines the trailing investment results of the Plan relative to the real return benchmark, the Consumer Price Index + 5%. The Plan has outperformed the real return objective over all trailing time periods, with the exception of the 20-year period.

As of September 30, 2019	Annualized Investment Returns (net of fee)					
	3 Years	5 Years	7 Years	10 Year	15 Years	20 Years
TRS	8.7%	7.1%	8.1%	8.8%	7.2%	6.3%
CPI + 5%	7.2%	6.6%	6.6%	6.8%	7.1%	7.3%
Difference	1.5	0.5	1.5	2.0	0.1	-1.0

Achieve Return Targets – Plan benchmark

The table below outlines the trailing investment results of the Plan relative to the custom benchmark outlined in the IPS. The Plan has outperformed the relative return objective over all trailing time periods.

As of September 30, 2019	Annualized Investment Returns (net of fee)					
	3 Years	5 Years	7 Years	10 Year	15 Years	20 Years
TRS	8.7%	7.1%	8.1%	8.8%	7.2%	6.3%
Custom Benchmark	8.0%	6.6%	7.6%	8.2%	6.9%	6.0%
Difference	0.7	0.5	0.5	0.6	0.3	0.3

Conclusions

We believe the stated objectives of the Plan are being met. The IPS includes two primary performance objectives in the “Total Fund Objectives” section. These include;

1. **Control Risk** – Properly diversify assets to control investment risk
2. **Achieve Return Targets** – Produce investment results that exceed;
 - The Actuarial Rate - Exceed the assumed actuarial rate of return adopted by the Board
 - Real Return Target - Exceeds the long-term rate of inflation by an annualized 5%
 - Plan benchmark - Exceeds the return of the Plan benchmark

Based on the analysis we performed the Plan has been successful in its ability to “Control Risk” over time. This is best reflected in the Plan’s ability to;

- Produce a level of volatility commensurate with the benchmark over time
- Produce risk adjusted investment results superior to most peers over the trailing 5 and 10-year periods

Additionally, the Plan has been successful in achieving its return targets (actuarial rate, real rate, and Plan benchmark) over the last 10-years. The 15 and 20-year periods are more mixed.

- ***Would the retirement fund have been able to sustain a commitment to the policies during the capital markets that have actually been experienced over the past ten, twenty, or thirty years?***

Background

As of December 31, 2019, the Plan maintained the asset allocation and policy targets outlined in the table below. The long-term policy target is the result of the Asset Allocation Study performed in 2019.

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	Asset Allocation	Interim Policy	Long Term	Long Term
	12/31/2019 (%)	Target	Policy Target	Policy Ranges
Investment Exposure	103.6%	102.7%	104.0%	99-110%
Total U.S.A.	17.0%	18.5%	18.0%	13-23%
Non-U.S. Developed	14.0%	13.2%	13.0%	8-18%
Emerging Markets	9.3%	9.0%	9.0%	4-14%
Private Equity	13.8%	14.7%	14.0%	9-19%
Global Equity	54.0%	55.4%	54.0%	47-61%
Government Bonds	14.4%	14.9%	16.0%	0-21%
Stable Value Hedge Funds	4.7%	5.0%	5.0%	0-10%
Absolute Return (include OAR)	3.2%	0.0%	0.0%	0-20%
Stable Value	22.3%	19.9%	21.0%	14-28%
Real Estate	13.5%	13.7%	15.0%	10-20%
Energy, Nat Res and Inf.	5.5%	5.7%	6.0%	1-11%
Commodities	0.2%	0.0%	0.0%	0-5%
Real Return	19.2%	19.5%	21.0%	14-28%
Risk Parity	8.1%	7.9%	8.0%	0-13%
Risk Parity	8.1%	7.9%	8.0%	0-13%
Cash	2.3%	2.0%	2.0%	0-7%
Asset Allocation Leverage	-5.9%	-4.7%	-6.0%	--
Net Asset Allocation	-3.6%	-2.7%	-4.0%	--
Total Fund	100.0%		100.0%	--

The Asset Allocation Study included forward and backward-looking analysis to ensure that the Plan would be able to sustain the commitment into the future. In addition to evaluating 30-years of stochastic investment projections, the Board evaluated 20-year historical investment outcomes of the asset allocation. This data included the experienced return over 20-years, the risk (volatility) over the period, the largest investment drawdown the portfolio experienced, and the liquidity ratio of the portfolio under these historic circumstances. This analysis was performed for the previous investment policy as well as three investment alternatives which were being considered for implementation.

The table below shows the trailing investment results achieved across various asset classes which the Plan invests in over those longer time periods. As shown, investment results were quite strong across the investable asset classes over those longer periods of time, and we believe the Plan would have been able to sustain a commitment to the policy during the capital markets that have actually been experienced over the past ten, twenty, or thirty years.

	Ten Years	Twenty Years	Thirty Years
Global Equity:			
Dow Jones U.S. Total Stock Market Index	13.4%	6.4%	10.0%
MSCI EAFE Index	5.5	3.3	4.5
MSCI Emerging Markets Index	3.7	6.7	8.1
HFRI Fund of Funds Composite Index	2.8	3.4	6.4
State Street Private Equity Index (qtr lagged)	12.2	8.3	--
Global Equity Policy Benchmark	9.0	--	--
Stable Value:			
Bloomberg Barclays Long Treasury Index	7.0%	7.3%	7.7%
HFRI Fund of Funds Conservative Index	2.8	3.2	5.6
3 Month LIBOR + 2%	2.9	4.1	--
90 Day U.S. Treasury Bill	0.6	1.8	2.9
Stable Value Policy Benchmark	6.0	--	--
Real Return:			
Bloomberg Barclays U.S. TIPS Index	3.4%	5.5%	--
NCREIF ODCE Index	10.4	7.2	6.3
Goldman Sachs Commodities Index	-5.4	-0.3	1.1
Real Return Policy Benchmark	7.8	--	--

Conclusions

Given the robust forward and backward-looking analysis performed as part of the Asset Allocation Study, as well as the strong historical investment results of the asset classes in which the Plan invests, we believe the current policy is sustainable. We believe the Plan would have been able to sustain a commitment to the policy during the capital markets that have been experienced over the past ten, twenty, or thirty years.

- ***Would the policy, if previously implemented, have achieved the objectives and results desired?***

Background

The table below shows the trailing investment results of the current investment policy over various long-term trailing periods, the actuarial discount rate of 7.25%, and the return of the Consumer Price Index + 5%. As shown, the current policy outperformed the current discount rate and the Consumer Price Index + 5% over all time periods shown below.

As of December 31, 2019	Annualized Investment Returns (net of fee)					
	3 Years	5 Years	7 Years	10 Year	15 Years	20 Years
TRS Current Policy	10.2%	7.6%	8.4%	9.2%	8.3%	7.6%
Discount Rate	7.3%	7.3%	7.3%	7.3%	7.3%	7.3%
CPI + 5%	7.2%	6.9%	6.7%	6.8%	7.1%	7.3%

Conclusions

Yes, we believe the current policy would have achieved the desired performance objectives if previously implemented.

- ***How often is the policy reviewed and/or updated? When was the most recent substantial change to the policy and why was this change made?***

Conclusions

The IPS states that document will be reviewed at least once every three years. Over recent periods the IPS was reviewed in 2019, 2018, and 2016. Additionally, the ancillary policies (Commission Credits Policy, Proxy Voting Policy, and Securities Lending Policy) have each been reviewed multiple times over the same time period. The most recent substantial changes to the policy occurred in 2019. The primary catalyst for the changes was the implementation of the new strategic asset allocation resulting from the 2019 Asset Allocation Study. A summary of the primary changes has been provided below;

- Changes required to implement the new strategic asset allocation
- Update asset class benchmarks as required by the asset allocation changes
- Define transition period for benchmarking purposes
- Refine manager allocation limit language
- Implement edits recommended by legal counsel

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Evaluation Component 2.



Evaluation Component 2.

A detailed review of the retirement system's investment asset allocation, including:

(A) the process for determining target allocations;

- *Does the system have a formal and/or written policy for determining and evaluating its asset allocation? Is the system following this policy?*

Background

The IPS states that IMD will assist the Board in engaging in an asset-liability study for the Plan at least once every five 5-years. It states that this process will review asset classes, return-risk assumptions, and correlation of returns with applicable benchmarks and across asset classes. The IPS defines a “key objective” of the asset-liability study to be the development of a diversified portfolio utilizing statistical modeling techniques. That result of the analysis will identify a long-term strategic policy and specify ranges of prudent portfolio exposures. The resulting strategic policy target is expected to meet the actuarial discount rate of the Plan and meet the risk parameters outlined within the IPS. Based on our review of the most recent Asset Allocation Study, we believe the Plan is following the policy.

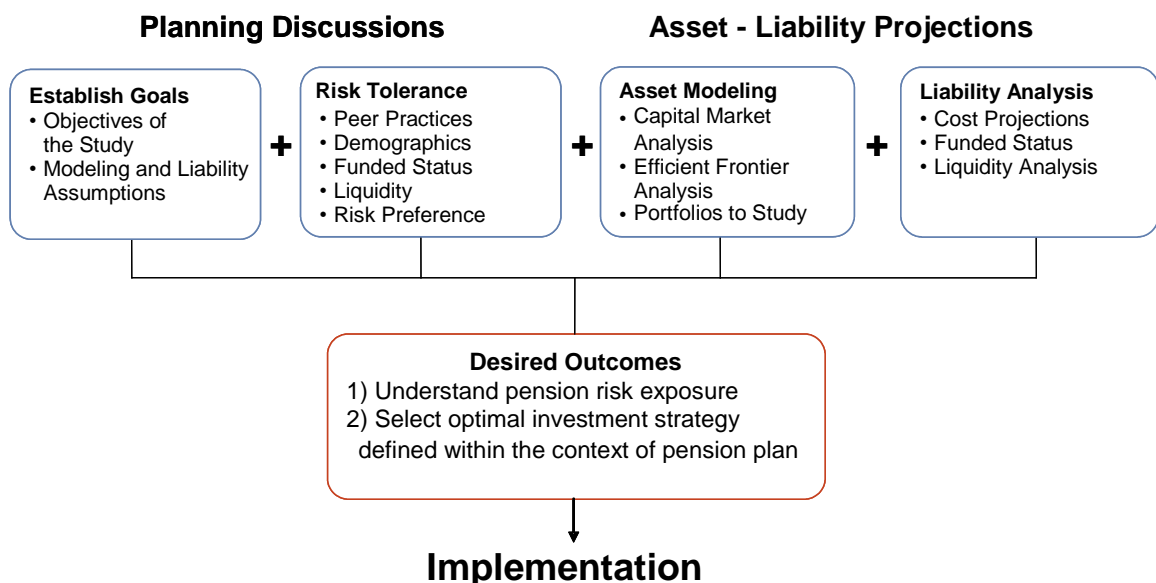
Conclusions

Yes, the Board articulates a process for determining and evaluating its asset allocation within the IPS and based on the review of the most recent Asset Allocation Study they are following this process.

- *If no formal policy exists, what is occurring in practice?*

Background

The following provides a more detailed description of the Asset Allocation Study in practice. The Plan's asset-liability study generally followed the process outlined below during the 2019 Asset Allocation Study:



Planning Discussions

During the planning segment of the evaluation, IMD established a Risk Framework for evaluating the current allocation, peer portfolios, and proposed alternative allocations. The Risk Framework evaluated each allocation from three perspectives;

- **Expected Volatility** – Ability of the portfolio to compound returns effectively through time
- **Probability of Earning 7.25%** – Ability of the portfolio to deliver on the Plan's return objective
- **Maximum Drawdown (loss)** – Ability of the portfolio to provide pension benefits at all times

Peer portfolios evaluated included the average U.S. pension, average endowment, average Canadian pension, 60/40 portfolio, and various stock bond mixes ("Peers"). The analysis compared the Expected Volatility, Probability of Earning 7.25%, and Maximum Drawdown across Peers. The analysis also provided efficient frontier projections of the various portfolios.

IMD then evaluated ways in which the current asset allocation target could be adjusted to enhance the expected rate of return, as well as the output resulting from the established Risk Framework.

At the end of the planning discussions the Board agreed to the portfolios to be modeled, the assumptions to model it, and the key metrics to evaluate portfolio efficiency and risk control.

Asset Modeling

IMD evaluated the portfolios and assumptions previously provided to the Board and further modeled how the strategic asset allocation could be improved. Key components of the modeling included further consideration of the portfolios';

- Probability of Earning 7.25%
- Volatility
- Percentage of time in a Drawdown
- Max Drawdown
- Liquidity ratio

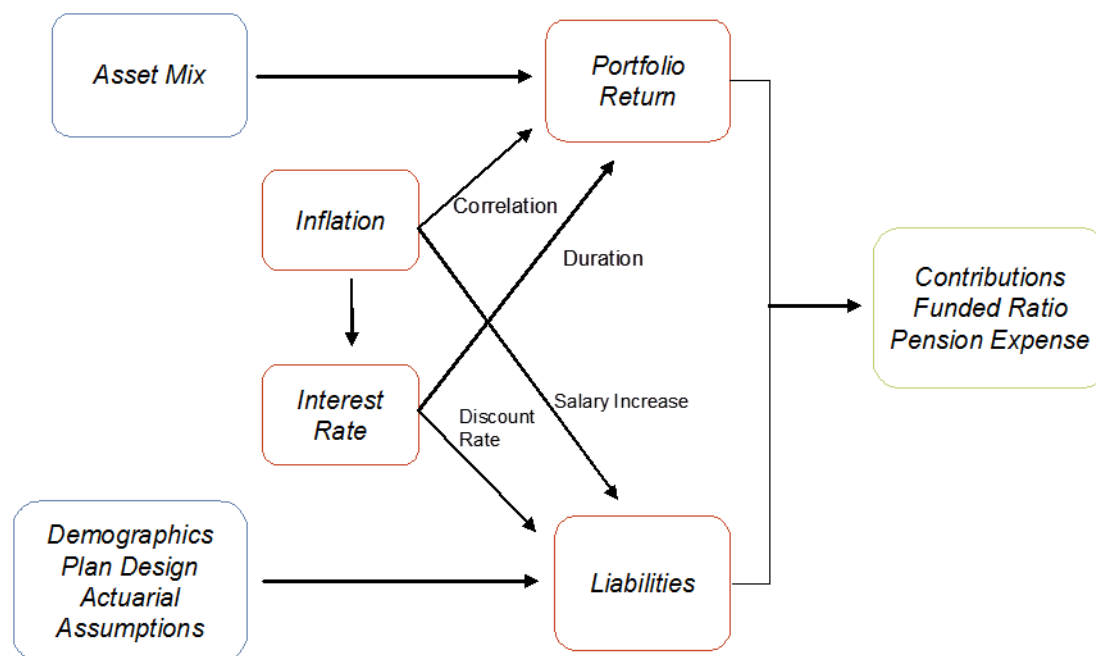
The modeling was intended to identify an efficient portfolio(s) which would then be further evaluated through stochastic analysis.

Liability Analysis

The Board's Advisor used their proprietary asset-liability model to generate 5,000 economic scenarios over the next thirty years using a Monte Carlo simulation process. Key variables simulated included:

- Inflation
- Interest rates
- Pay increases
- Asset class returns

The graphic below shows how pension assets and liabilities are impacted by common factors such as inflation and interest rates. It also depicts the flow chart for asset-liability modeling used during the Asset Allocation Study.



The simulations lead to a projection of assets and liabilities under all economic scenarios for the portfolios evaluated, and allowed the Board to evaluate the expected risk-return tradeoff in terms of:

- Investment return
- Funded ratio
- Annual net outflows
- Long term "Economic Cost"
- Liquidity

Beyond focusing on the key individual variables included within the analysis, the Board evaluated a metric called “Economic Cost.” This metric combines cash contributions and funded status changes in a single variable, and it can be the most informative variable for making asset allocation decisions. The liability component of the analysis reviewed by the Board attempts to review the portfolios ability to:

- Meets the stated goals
- Evaluate consistency with its risk tolerance
- Meet liabilities effectively in the long run
- Manage pension costs to the best extent possible

Conclusions

The process occurring in practice is robust, and we believe represents a leading-edge practice in developing strategic asset allocation. While the process is articulated at a high level within the IPS, we believed further detail of the process in practice was appropriate. The Background above outlines the process that occurred in 2019 to develop the current strategic asset allocation.

- ***Who is responsible for making the decisions regarding strategic asset allocation?***

Conclusions

The Board is responsible for making the decisions regarding the strategic asset allocation of the Plan.

- ***How is the system’s overall risk tolerance expressed and measured?***

Background

The concept of risk and risk management exists throughout the IPS. Nearly every concept within the IPS has consideration on how it may contribute to the risk of the Plan. The Executive Summary section of the IPS includes a Risk Management component, The Risk Management component of the Executive Summary states that IMD will monitor and manage risk of the Plan and report to the Board on a periodic basis. The IPS defines key risks as including, but are not limited to: market risk, foreign exchange risk, credit and counterparty risk, leverage, liquidity, and tracking error.

Article 10 of the IPS is the Risk Management and Oversight section. This section defines the risk management processes associated with;

- Market Risk Management
- Foreign-Exchange Risk Management
- Credit Risk Management
- Liquidity Risk Management
- Operations Risk Management
- Settlement Risk Management
- Legal Risk Management
- Risk Management Compliance Cure Periods and Remedies
- Permitted Uses of Leverage

Baseline risk positioning or tolerance is represented by the long-term strategic asset allocation. It has been determined through the Asset Allocation Study that this allocation represents the required market exposures to allow the Plan to most efficiently fund future benefit payments. Risk tolerance relative to the baseline positioning is monitored in various ways;

- Asset allocation limits
 - The asset allocation of the Plan must be maintained within the asset allocation ranges set by the Board
- Risk limit
 - The active risk positioning (tracking error) of the public assets within the Plan will be maintained within the ranges set forth in the IPS
 - The Plan and its benchmark's total estimated risk relative to the upper and lower bounds corresponding to the maximum and minimum downside risk measures that could be achieved through the asset allocation limits within the IPS
 - Private market assets holdings
 - Proxies for private market assets may be used within risk projections delivered to the Board, unless they are believed to distort the true risk characteristics of the portfolio
- Active risk limits
 - Similar to the Plan active risk analysis, active risk targets and ranges are to be applied to each public asset class mandate

Conclusions

The system's overall risk tolerance is expressed and measured in many ways. The predominant expression of risk tolerance is the selection of the long-term strategic asset allocation during the Asset Allocation Study. The Board has determined that this allocation represents the appropriate risk positioning to achieve the objectives of the Plan over time. That risk positioning is managed through the Plan's tracking error targets and asset allocation ranges, which have been adopted within the Plan's IPS.

- ***How often is the strategic asset allocation reviewed?***

Conclusions

The IPS states that IMD will assist the Board in engaging in an asset-liability study for the Plan at least once every five 5-years. This has generally been the timeframe for performing a full strategic asset allocation review.

- ***Do the system's investment consultants and actuaries communicate regarding their respective future expectations?***

Conclusions

Yes, the Board's Advisor and actuary communicate regarding their respective future expectations. The Advisor provides their capital market assumptions to the actuary, and the actuary includes the Advisor's assumptions in its presentation to the Board regarding the selection of the actuarial discount rate. Additionally, the and the actuary share research on the drivers of long-term capital market assumptions and the range of assumptions found within the industry.

- ***How does the current assumed rate of return used for discounting plan liabilities factor into the discussion and decision-making associated with setting the asset allocation? Is the actuarial expected return on assets a function of the asset allocation or has the asset allocation been chosen to meet the desired actuarial expected return on assets?***

Conclusions

The process for deriving the strategic asset allocation of the Plan considers the actuarial discount rate, and the ability to achieve that assumption through the returns offered in the capital markets. The actuarial discount rate is a part of the mosaic of information considered by the Board when selecting the strategic allocation that will most efficiently allow the Plan to meet its obligations. Ultimately, the actuarial expected return on assets is a function of the asset allocation selected by the Board.

- ***Is the system following industry best practices regarding the establishment and evaluation of the asset allocation?***

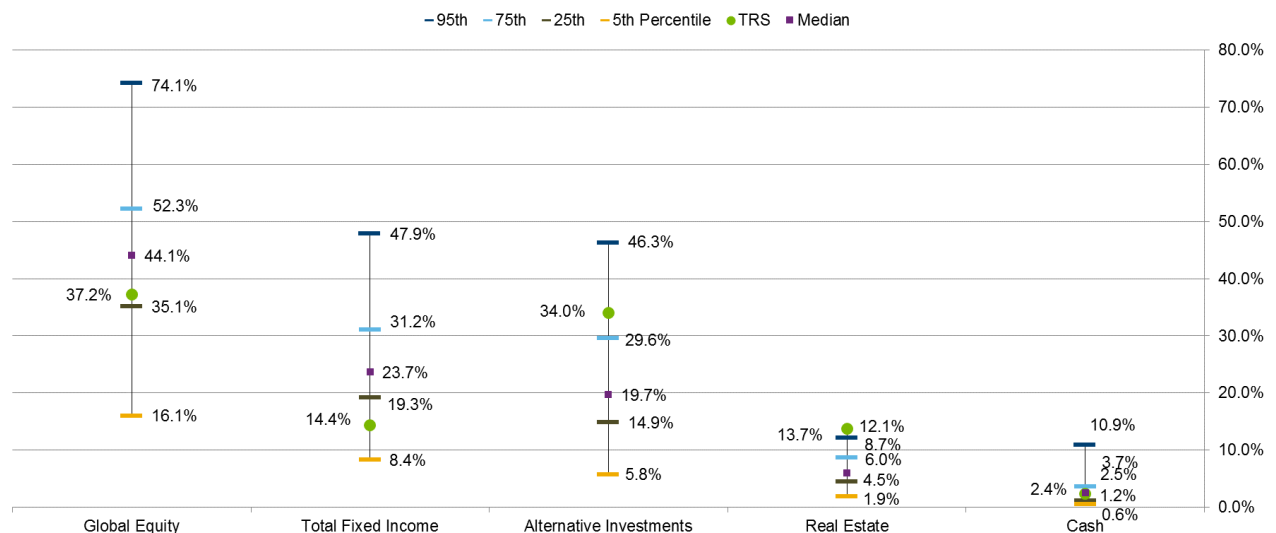
Conclusions

The processes outlined above with regards to establishing and evaluating asset allocation is consistent with industry best practice.

- ***How does the asset allocation compare to peer systems?***

Conclusions

The table below shows the asset allocation of the Plan relative to peer public funds with assets greater than \$10 billion as of September 30, 2019. The ends of each line represent the 95th and 5th percentile of exposures, the middle light blue and grey lines represent the 25th and 75th percentile of exposures, the purple square represents the median, and the green dot represents TRS exposure. The information is sourced from Investment Metrics peer universe dataset. As shown, the Plan has less equity and fixed income than the median peer, with a higher allocation to alternatives (PE, risk parity, hedge funds, and ENRI) and real estate.



(B) the expected risk and expected rate of return, categorized by asset class;

- ***What are the strategic and tactical allocations?***

Conclusions

The long-term strategic asset allocation and ranges of the Plan are outlined in the table below (as of December 31, 2019). The asset allocation of the Plan is not tactically allocated outside the ranges. The Total Public Fund tracking error maximum of 300bps prevents material asset allocation biases. IMD does however tactically tilt the portfolio within the policy ranges. Over recent periods the Plan has maintained a modest overweight to the Absolute Return Portfolio.

	Long Term Policy Target	Long Term Policy Ranges
Investment Exposure	104.0%	99-110%
Total U.S.A.	18.0%	13-23%
Non-U.S. Developed	13.0%	8-18%
Emerging Markets	9.0%	4-14%
Private Equity	14.0%	9-19%
Global Equity	54.0%	47-61%
Government Bonds	16.0%	0-21%
Stable Value Hedge Funds	5.0%	0-10%
Absolute Return (including OAR)	0.0%	0-20%
Stable Value	21.0%	14-28%
Real Estate	15.0%	10-20%
Energy, Natural Resource and Inf.	6.0%	1-11%
Commodities	0.0%	0-5%
Real Return	21.0%	14-28%
Risk Parity	8.0%	0-13%
Risk Parity	8.0%	0-13%
Cash	2.0%	0-7%
Asset Allocation Leverage	-6.0%	--
Net Asset Allocation	-4.0%	--
Total Fund	100.0%	--

- ***What is the expected risk and expected rate of return of each asset class?***

Conclusions

The table below outlines the expected return and risk of each asset class the Plan invests in, as well as the Plan in aggregate. The table utilizes the 10-year capital market assumptions of Board's Advisor. During the Asset Allocation Study capital market assumptions are also derived by IMD. IMD collects the capital market assumptions from its partners (advisors, consultants, investment managers, etc.) and uses this information to formulate the assumptions used for their asset allocation modeling.

Asset Class	Long Term Targets	Expected Nominal Return	Expected Risk
U.S. Equity	18%	6.1%	17.9%
Non-US Developed	13%	6.8%	20.0%
Emerging Markets	9%	7.5%	27.0%
Private Equity	14%	8.2%	26.0%
Government Bonds	16%	2.5%	9.0%
Stable Value Hedge Funds	5%	4.7%	6.9%
Real Estate	15%	7.3%	20.8%
Energy, Natural Resources and Infrastructure	6%	7.7%	14.5%
Risk Parity	8%	5.8%	12.0%
Net Asset Allocation Leverage	-4%	--	--
Teacher Retirement System of Texas	100.0%	--	--
Estimated Return (Nominal)	7.2%		
Estimated Risk	13.7%		
Sharpe Ratio	0.402		

- ***How is this risk measured and how are the expected rates of return determined? What is the time horizon?***

Background

The Board's Advisor develops proprietary capital market assumptions. They incorporate assumptions on returns, volatilities (standard deviations), and correlations that are updated on a quarterly basis. The capital market projections are developed by the firm's Global Asset Allocation team and represent the team's long-term capital market outlook (10 and 30 years). The output provided in the previous response represents their 10-year assumptions.

The Advisor employs various methodologies for determining the expected return of equities, bonds, and alternatives. These methods incorporate both quantitative and qualitative inputs. The assumptions reflect current market valuations and future prospects rather than relying solely on historic averages, a particularly important feature when markets move to extremes as they have done over the past few years.

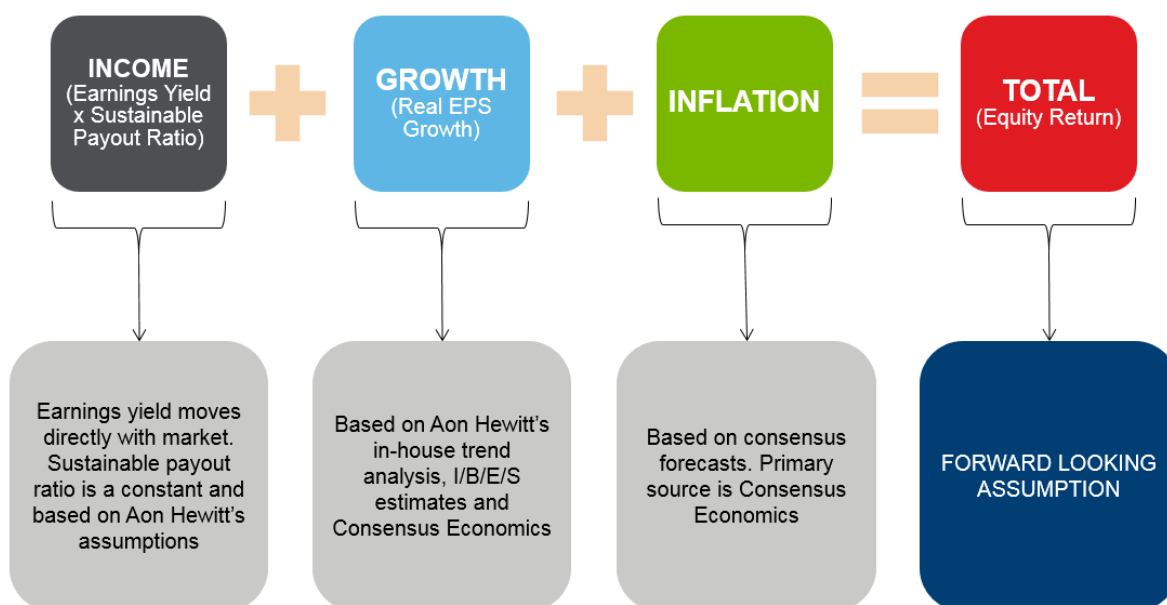
The following sections provide an overview of how the volatility (risk) assumptions are derived and provide examples of how the return assumptions are derived (equity and fixed income).

Risk (volatility)

The Advisor uses volatility as a measure of risk (when discussing capital market assumptions). Assumed volatilities are formulated with reference to implied volatilities priced into option contracts of various terms and with regard to historical volatility levels. Correlation assumptions are generally similar to actual historical results; however, the Advisor makes adjustments to reflect forward-looking views as well as current market fundamentals.

Equity Assumptions

The chart and table below provide a general overview of how equity assumptions are determined.



	U.S. ⁽²⁾	U.K.	Europe ex U.K.	Japan	Canada	Switzerland	Australia	Emerging Markets*
Earnings Yield * Sustainable Payout Ratio	2.2%	2.8%	2.7%	2.9%	2.6%	2.3%	2.8%	2.7%
Real Earnings Growth	1.9	1.7	1.6	1.2	1.7	1.7	2.2	2.3
Inflation	2.2	2.1	1.8	0.9	2.0	1.1	2.3	2.4
Methodological Differences ⁽¹⁾	-0.3	-0.3	-0.1	-0.1	-0.2	-0.2	-0.3	0.1
Current Nominal Return Assumption (Local Currency)	6.0%	6.4%	6.0%	5.0%	6.1%	4.9%	7.0%	7.5%*

*EM in USD

(1) Model is a Discounted Cash Flow (DCF) model, not an additive building block model

(2) Represents Large Cap

Fixed Income Assumptions

The chart and table below provide a general overview of how government bond return assumptions are determined. The fixed income returns outlined in the previous response represent longer duration bonds than the example below.



Return Component	Q1 2020	
Initial Yield	1.8%	Prevailing market yield
Capital Gain/Loss	-0.1%	Projected yield increase results in projected capital losses. Long Duration bonds suffer larger losses than short
Increase/Decrease in Yield (Income)	0.2%	Projected yield increases leads to ability to reinvest at higher yields in future
Roll Return	0.2%	Roll return on rebalancing has a positive impact on the return assumption
Total 10-Year Return Assumption	2.0%	

Conclusions

The Board's Advisor uses volatility as a measure of risk (when discussing capital market assumptions). The Asset Allocation Study and other work on risk factor in other forms of risk (liquidity, funded ratio, factor risk, tracking error, etc.).

The Advisor employs various methodologies for determining the expected return of equities, bonds, and alternatives. These methods incorporate both quantitative and qualitative inputs. The Advisor's assumptions reflect current market valuations and future prospects rather than relying solely on historic averages, a particularly important feature when markets move to extremes as they have done over the past few years.

Examples of the calculation of the Advisor's capital market assumptions are provided in the overview above (equity and fixed income). A more detailed presentation of the capital market assumptions is available if desired.

The Advisor's capital market projections are developed by the firm's Global Asset Allocation team and represent the team's long-term capital market outlook (10 and 30 years). The output provided above represents 10-year assumptions.

- ***What mix of assets is necessary to achieve the plan's investment return and risk objectives?***

Conclusions

The Plan's current asset allocation approximates the actuarial discount rate. Additionally, the process performed to determine the appropriate long-term strategic asset allocation was robust. The Advisor's capital market assumptions are updated on a quarterly basis, and they fluctuate based on changes in the market environment. Over recent periods the forward-looking projection over a 10-year period has been roughly in-line with the actuarial discount rate, while the longer-term projections (30-years) are slightly greater than the actuarial discount rate.

There is nothing in our analysis that would position us to say that a different asset allocation would be better positioned to meet the investment return and risk objectives of the Plan.

- ***What consideration is given to active vs. passive management?***

Conclusions

IMD believes that active investment risk, when implemented by skilled managers, will be compensated over time. Due to this belief, the Plan's investments are primarily actively managed. In 2017 IMD performed a global equity best practices review where the structure of the equity portfolio was evaluated, and three presentations were made to the Board updating them on the review. At the conclusion of the evaluation IMD determined that internally managed factor-based strategies were superior to passive indexation, and that the Plan could maintain an expectation of alpha generation through a factor implementation, with a similar cost profile to passive equity management. IMD believes that tilting to long-term rewarded factors will produce higher returns than passive indices over time. The Plan maintains minimal exposure to passive equity strategies, and these exposures are principally for rebalancing and transition purposes.

- ***Are the investments reasonably diversified?***

Conclusions

The investments of the Plan are well diversified across and within various asset classes. The table below outlines the long-term strategic target of the Plan. As shown, the portfolio is diversified across global stock markets (public and private), real return assets (real estate, energy, natural resources and infrastructure), long treasuries, and cash. Additionally, the Plan is further diversified through its use of risk reducing hedge funds and risk parity.

	Long Term Policy Target	Long Term Policy Ranges
Investment Exposure	104.0%	99-110%
Total U.S.A.	18.0%	13-23%
Non-U.S. Developed	13.0%	8-18%
Emerging Markets	9.0%	4-14%
Private Equity	14.0%	9-19%
Global Equity	54.0%	47-61%
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Absolute Return (including OAR)	0.0%	0-20%
Stable Value	21.0%	14-28%
Real Estate	15.0%	10-20%
Energy, Natural Resource and Inf.	6.0%	1-11%
Commodities	0.0%	0-5%
Real Return	21.0%	14-28%
Risk Parity	8.0%	0-13%
Risk Parity	8.0%	0-13%
Cash	2.0%	0-7%
Asset Allocation Leverage	-6.0%	--
Net Asset Allocation	-4.0%	--
Total Fund	100.0%	--

- ***How often are the strategic and tactical allocations reviewed?***

Conclusions

The IPS states that IMD will assist the Board in engaging in an asset-liability study for the Plan at least once every five years. In practice strategic asset allocation reviews have occurred in-line with the policy. Asset allocation relative to the long-term strategic target is monitored on a daily basis. The asset allocation of the Plan is not tactically allocated outside the policy ranges. The Total Public Fund tracking error maximum of 300bps prevents material asset allocation biases. IMD does however tactically tilt the portfolio within the policy ranges. Over recent periods the Plan has maintained a modest overweight to the Absolute Return Portfolio.

(C) the appropriateness of selection and valuation methodologies of alternative and illiquid assets;

- ***Are the system's alternative investments appropriate given its size and level of investment expertise?***

Background

We believe alternative investments can play an important role in enhancing return and reducing risk in a diversified portfolio. We also believe alternative investments allow institutional investors to further diversify into additional components of the investable opportunity set. We support the use of alternative investments in client portfolios. We believe allocating to alternative investments (private equity, real assets, or hedge funds) can provide enhanced returns (alpha) at a volatility level that is lower or similar to public markets.

The appropriateness of an alternatives allocation is dependent on a number of factors. Clients who choose to allocate to alternatives require;

- Sufficient assets to invest in a direct and diversified manner
- An appropriate level of internal resources
- A robust governance structure
- The ability to tolerate illiquidity
- The ability to tolerate increased cost and complexity

IMD exhibits many of the traits required to be successful in investing in alternative assets;

- Long-Time Horizon
 - Through the Asset Allocation Study process the Board is able to ensure sufficient short-term and long-term liquidity to maintain ongoing and growing exposure to alternative investments
- Resources
 - IMD maintains significant access to resources through its internal staff, strategic partners, external investment managers, consultants, and advisors
 - The "Build the Fleet" initiative – meaningfully increase internal investment staff and shift ~40% of the private market portfolio in house
- Board Perspective
 - Historical Board support for the use of alternative investments, and a view that the

- Plan can use its size as a strategic advantage to increase alpha in the alternatives space
 - Support the growth of staffing resources to enhance returns and manage investment expenses “Build the Fleet”
- Robust Governance Structure
 - Clear delegation of responsibility and strong oversight functions
- Asset Scale
 - The scale of TRS allows IMD to allocate significantly to direct deals and co-investments, this has allowed for return enhancement and investment management fee reductions

Conclusions

The size of TRS, the duration of its liabilities, the depth of IMD, and the support of the Board give TRS a competitive advantage in achieving alpha in the alternative investment space. The goal of the “Build the Fleet” initiative is intended to assist IMD in further establishing this competitive advantage and allowing them to generate alpha for the Plan. We believe the system’s alternative investments are appropriate given its size and level of investment expertise. We believe IMD is well positioned relative to other similarly sized institutional investors to capture the benefits of alternative investing.

- ***What valuation methodologies are used to measure alternative and illiquid assets? What alternative valuation methodologies exist and what makes the chosen method most appropriate?***

Conclusions

The Plan maintains a statement which documents the appropriate processes for valuing assets (Fair Valuation Pricing Guidelines (“Guidelines”). The Guidelines were last updated in September of 2018. The policy states that as a governmental entity, TRS financial reporting is governed by the Governmental Accounting Standards Board (“GASB”). GASB Statement No. 72: Fair Value Measurement and Application addresses accounting and financial reporting issues related to fair value measurements. The GASB 72 defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the government’s measurement date.

The Guidelines are intended to provide guidance for determining a fair value measurement for financial reporting purposes. It also provides guidance for applying fair value to certain investments and disclosures related to all fair value measurements.

As outlined in the Guidelines, GASB 72 requires TRS use valuation techniques that are appropriate under the circumstances and for which sufficient data are available to measure fair value and the techniques should be consistent with;

- Market approach
 - Value based on market transactions involving identical or comparable assets
- Cost approach
 - The cost to replace the present service capacity of an asset
- Income approach
 - Discounted cash flow model

NAV per Share or Ownership Interest Valuation

The Guidelines include a section titled “NAV per Share or Ownership Interest Valuation”. This section outlines valuation for limited partnership investments in private equity, real asset, hedge funds and other general partner (“GP”) investments that are reported at NAV per share. The Guidelines state that GASB Statement No. 72 allows TRS to use the NAV per share as fair value, provided a transaction is not expected at a different value, and that the NAV is calculated in a manner consistent with the Financial Accounting Standards Board (“FASB”). If the NAV is not calculated in a manner consistent with FASB TRS has a documented process to be followed prior to using the provided NAV.

Direct Investments in Private Equity Securities

The Guidelines include a section titled “Direct Investments in Private Equity Securities”. This section outlines the process for valuing direct investments. The Guidelines state when a GP price is not available, a valuation expert will be employed by TRS to assist in the pricing of the security. Prices struck by a valuation expert will be reviewed for reasonableness by Investment Accounting before they are used to value an unlisted private equity security.

(D) future cash flow and liquidity needs;

- ***What are the plan’s anticipated future cash flow and liquidity needs? Is this based on an open or closed group projection?***

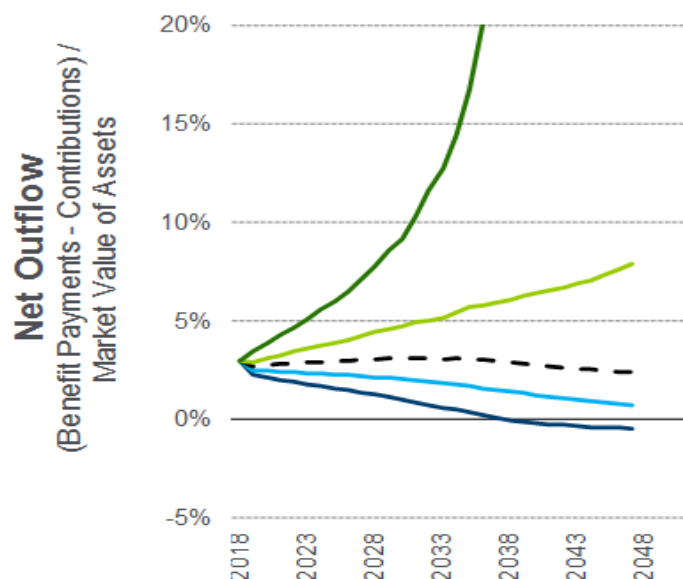
Background

As part of the Asset Allocation Study performed to determine the long-term strategic asset allocation IMD and the Advisor provided the Board analysis on the liquidity needs of the Plan over short and long time periods.

Long Term Liquidity

The chart below represents the stochastic liquidity projections resulting from the 2019 asset liability study utilizing open group projections. The top and bottom line represent the 95th and 5th percentile projections, respectively. The green and light blue represent the 75th and 25th percentile, and the black line represents the projected median outcome. As shown, annual net outflows from the Plan are expected to be ~3% and slowly fall to 2.4% over a 30-year period. By 2027 outflows are expected to be between 1.5% and 5.9% in the central 50% of scenarios. As a firm, we believe net annual cash outflows approaching 10% is problematic. The projections show that liquidity needs only approach 10% after 2027 and in the 95th percentile scenario (an extreme scenario).

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Year	2027	2037	2047
5th Percentile	1.4%	0.1%	-0.5%
25th Percentile	2.2%	1.5%	0.7%
50th Percentile	3.0%	3.0%	2.4%
75th Percentile	4.2%	5.9%	7.9%
95th Percentile	7.1%	24.1%	100.0%
Probability > 10%	1%	21%	25%

Short Term Liquidity

To evaluate liquidity needs over a shorter-term basis IMD calculates a “Liquidity Ratio”. The Liquidity Ratio is the Plan’s sources of liquidity (Cash, U.S. Treasuries, TIPs, Equity, commodities, and securities lending collateral) divided by the uses of liquidity (normal uses of liquidity, stressed securities lending, stressed derivatives, stressed private markets). This ratio is monitored on an ongoing basis to ensure reasonable liquidity is maintained. IMD provides the Board updates on the liquidity of the Plan on an ongoing basis. This ratio is also provided when discussing potential asset allocation changes to ensure the new strategic policy is capable on maintaining short term required liquidity.

Conclusions

Annual net outflows from the Plan are expected to be ~3% and slowly fall to 2.4% over a 30-year period, in the median market scenario. These projections are outlined in more detail above and are based on an open group projection.

- ***When was the last time an asset-liability study was performed?***

Conclusions

An asset liability study was performed in 2019.

- ***How are system-specific issues incorporated in the asset allocation process? What is the current funded status of the plan and what impact does it have? What changes should be considered when the plan is severely underfunded, approaching full funding, or in a surplus? How does the difference between expected short-term inflows (contributions, dividends, interest, etc.) and outflows (distributions and expenses) impact the allocation? How does the underlying nature of the liabilities impact the allocation (e.g. pay-based vs. flat \$ benefit, automatic COLAs, DROP, etc.)?***

Conclusions

The current funded status of the pension plan is 76.4% as of August 31, 2019 (as calculated by the plan actuary).

Funded status, along with many other system-specific circumstances, are incorporated into the Plan's Asset Allocation Study as a component of the asset-liability study. During the asset-liability study data is gathered from the actuary that factors in all nuances of the Plan, including the factors outlined in the question. Because the asset-liability study starts with information from the actuary, all Plan-specific details from the liability side are included and their relationship with the assets are evaluated dynamically.

Funded status is one of many components to be considered in making investment decisions. Ultimately, the future funding of a pension plan is comprised of a combination of asset returns and cash contributions. The more underfunded a plan is, the more strain there could be to meet the promise of future benefit payments. This dynamic could point to investment strategies that have less asset lockups associated with alternative / illiquid assets. Conversely, the better funded a plan is, the more appetite there may be to consider such alternative / illiquid assets.

Net inflow/outflow is another component to be considered during the investment strategy process and many times serves as a precursor for what is to come with the funded status. For example, projected net outflows could gradually reduce the funded status over time, potentially lessening the appeal for alternative / illiquid assets or necessitating increases in plan contributions to boost the funded position.

The value of an asset-liability analysis is that it simultaneously considers the assets, liabilities, future funding, and their interaction with one another within a holistic framework. This is why we believe such analysis is so crucial for the long-term viability of a benefit program, so that the plan sponsors are aware of potential future risks and have considered them as part of the strategic asset allocation process.

- ***What types of stress testing are incorporated in the process?***

Conclusions

During the Asset Allocation Study performed in 2019, the Board was provided with many types of analysis that were meant to be representative of stress testing or stressed market representation. This included asset only stress tests that look at the impact to the Plan's investments, as well as stressed scenarios from an asset/liability perspective. Stress testing that was performed included;

Asset Only

- Max Drawdown
- Value at risk
- Worst quarter
- Various scenario analysis (financial crisis, dot-com crash, sovereign debt crisis, bond crash, etcetera)
- Distribution of forward looking and backward-looking returns

Asset\Liability (30-year forward looking analysis)

- Projected funded ratio including worst-case scenario (95th percentile)
- Annual liquidity needs including worst-case scenario
- Economic cost in a worst-case scenario
- Liquidity in a worst-case scenario (short- and long-term liquidity)

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Evaluation Component 3.



Evaluation Component 3.

A review of the appropriateness of investment fees and commissions paid by the retirement system;

- ***Does the system have a written investment management fee policy?***

Conclusions

The Plan does not have a written policy with regards to rules for fee negotiations. Based on our conversations with IMD this is due to the unique nature of each investment and how fees are structured and negotiated. IMD stressed during our interactions that they strive for the lowest fees possible with each investment opportunity. All investment fees are approved by the appropriate investment committee. In responding to this question, we evaluated the policy documents of our other public fund clients and evaluated the policy documents of TRS peers. Through our review we did not identify any plans with a written policy with regards to rules for fee negotiations. We did identify a couple clients with broad language in their IPS with regards to ongoing reviews of fees and maintaining fees at acceptable levels.

IMD does maintain procedures for the payment of management and incentive fees. The procedure document outlines the process for receiving, reconciling, paying, and documenting the payment of management and incentive fees.

- ***What direct and indirect investment fees and commissions are paid by the system?***

Conclusions

The investment fees and commissions paid by the system include management fees, performance-based fees, carried interest, and broker commissions. These fees are outlined within the Plan's Comprehensive Annual Financial Report ("CAFR") in the Investment Section. It is our understanding that the fees outlined within the CAFR represent all direct (fees paid directly by the Plan) as well as indirect (expenses netted against Plan assets) investment fees and commissions paid by the Plan. Internal IMD operating expenses, primarily the IMD Operating Budget, are reported annually to the Board as part of the annual budget review and approval process.

- ***How are the fees reported to the board?***

Conclusions

Fees are reported to the Board in a variety of ways. These include;

- Annual Budget Exercise
 - Review of internal investment costs, including legal costs
- Investment Cost Effectiveness Analysis ("CEM Benchmarking Report")
 - Review of internal and external cost relative to peers
- Transparency report
 - Monthly update on investment results and the IIC, including reviews of managers being considered for the Plan, including investment management fee agreements

- CAFR (Annual Audit)
 - Annual report which outlines internal and external management fees, performance-based fees, carried interest, and broker commissions.
- ***Are all forms of manager compensation included in reported fees?***

Conclusions

Yes, all forms of manager compensation are included in reported fees. As shown above, fees are reported to the Board and stakeholders in a variety of ways. Some analysis is intended to represent internal costs while others are intended to represent external cost. Ways the Board and other stakeholders received aggregate investment management compensation include the annual CAFR and in the annual CEM Benchmarking Report.

- ***How do these fees compare to peer group and industry averages for similar services? How are the fee benchmarks determined?***

Conclusions

The Plan participates in the annual CEM Benchmarking Report. The CEM Benchmarking Report is the industry standard for objective fee benchmarking relative to peer institutions. CEM maintains a database of pertinent fee data on relevant peers of TRS to perform its analysis. The December 31, 2018 report found that the investment costs of the Plan were slightly higher (0.038%) than the CEM benchmarked costs. This was found to be the result of a higher cost implementation style. Factors associated with increased fees included the higher use of active management and private assets. Offsetting implementation decisions included a higher use of direct investments and co-investments. Fees relative to peers were also reduced by TRS paying less than peers for similar investment management services.

The benchmark cost developed by CEM represents the median cost of peers of each underlying invested asset class weighted to reflect the Plan's actual asset allocation. The report provides a detailed breakdown on the drivers of that fee difference relative to the benchmarked cost.

The CEM report also outlines total investment costs relative to peers without adjusting for differences in asset allocation. Given the Plan's relatively higher use of alternative investments (which typically have higher implementation costs) and lower use of passive investment management, the fee differential relative to the peer group without adjusting for asset allocation differences is larger. However, given the verbiage in the PRB guidance to evaluate industry averages for similar services, we believe the 0.038% difference provided above is the more appropriate comparison. Investment expense is only one factor in determining asset allocation, TRS has chosen to use alternative investments for other reasons including diversification. We believe the CEM fee benchmark is the appropriate comparison benchmark.

- ***How often are the fees reviewed for reasonableness?***

Conclusions

Fees are evaluated on an ongoing basis as IMD makes investment decisions for the Plan. Additionally, fees are evaluated through the following processes at least annually;

- Annual Budget Exercise
 - Review of internal investment costs, including legal costs
- CEM Benchmarking Report
 - Review of internal and external cost relative to peers
- Transparency report
 - Monthly update on investment results and the IIC, including reviews of managers being considered for the Plan, including investment management fee agreements
- CAFR (Annual Audit)
 - Annual report which reports internal and external management fees, performance-based fees, carried interest, and broker commissions
- Performance Reviews
 - IMD formally reviews investment results semi-annually for all investments
- Fee calculations:
 - All management and performance fees billed by invoice to TRS from public investment management funds are recalculated by IMD operations prior to payment
 - External recalculation of management and performance fees for hedge fund and other public market limited partnerships are performed quarterly
 - TRS will on-board a service provider for recalculation of management and performance fees for private market limited partnerships in FY 2020

IMD does maintain procedures for the payment of management and incentive fees. The procedure document outlines the process for receiving, reconciling, paying, and documenting the payment of management and incentive fees.

- ***Are there any fees not directly related to the management of the portfolio?***

Conclusions

No, based on our understanding of the investment program and our conversations with IMD, there are no fees that are not related to the management of the portfolio.

- ***Is an attorney reviewing any investment fee arrangements for alternative investments?***

Conclusions

Yes, under the direction of TRS General Counsel, internal legal counsel manages external legal counsel and reviews the material terms of all investment transaction deals. Internal and external legal counsel advise the IMD on those terms in accordance with fiduciary principles. According to Texas Government Code §825.203 and §402.0212, the Texas Attorney General approves contracts with external legal counsel. TRS General Counsel works diligently with the Attorney General's Office to ensure the System retains firms with the required expertise with respect to investment-related transactional reviews.

Evaluation Component 4.



Evaluation Component 4.

A review of the retirement system's governance processes related to investment activities, including investment decision-making processes, delegation of investment authority, and board investment expertise and education;

Transparency

- ***Does the system have a written governance policy statement outlining the governance structure? Is it a stand-alone document or part of the IPS?***

Conclusions

Yes, the IPS, as well as the Bylaws of the Board of Trustees of TRS, most recently amended December 24, 2018 ("Bylaws"), are the overarching written policy statements outlining the investment governance structure of TRS.

The IPS details the respective roles of the Board, staff, advisors and consultants. As reflected in the IPS, the Board is the ultimate fiduciary for investing TRS trust assets and establishes investment objectives and policy and monitors the actions of TRS staff, including the IMD, to ensure compliance with its established policies. The Board selects investment advisors to provide education, advice, and assistance with development and review of policies and procedures, asset allocation, and portfolio performance review.

The IMD is tasked with implementing and reporting on the Board established policies. The IIC reviews and authorizes proposed investments and external manager engagements within the parameters set forth in the IPS. The IIC is comprised of a minimum of five members, including the CIO, Deputy Chief Investment Officer, Chief Risk Officer, and two IMD Senior Managing Directors. The CIO is responsible for establishing IIC procedures and guidelines, including authorization of investment or external manager recommendations and engagements. The CIO has the power to veto any proposed investment or delegation of investment discretion. The Executive Director or his designee may attend any meeting of the IIC and receives all IIC materials. The Executive Director, after consultation with the CIO, has the power to veto any proposed investment or delegation of investment discretion when he deems such veto to be in TRS' best interest. The IMD is authorized to engage consultants for assistance with respect to investment opportunities and for due diligence, analysis and advice. The IPS also states that any Board member may request any external investment opportunity scheduled for consideration by the IIC be submitted to the Board for consideration.

The Bylaws also outline the responsibilities of the Board, including the adoption and periodic review of rules, regulations, bylaws, and policies; selection and oversight of the executive director to ensure effective management practices are followed in the organization; approval of the annual budget; receiving reports from staff, investment counsel and others regarding the investment portfolio; reviewing investment performance, asset mix, portfolio characteristics, cash flow, transactions, and monitoring compliance with investment policies and guidelines; establishing committees; delegating authority to the staff through the executive director; selection of one of more custodial banks to provide custodial services; selecting and evaluating investment counsel or other consultants to provide expert advice and assistance to the Board as the Board deems necessary to exercise its investment and trust responsibilities; select and evaluate fiduciary counsel; select and establish the compensation of the CIO, in consultation with the executive director, and to select, replace, dismiss, evaluate and set the compensation of the chief audit executive in consultation with the Audit, Compliance & Ethics Committee and executive director.

The Bylaws establish seven standing committees: Audit, Compliance and Ethics Committee; Benefits Committee, Budget Committee, Investment Management Committee, Policy Committee, Strategic Planning Committee, and Compensation Committee. The roles and responsibilities of each committee are outlined.

The Investment Management Committee serves as an advisory committee to the Board, and its responsibilities are outlined by the Bylaws. The Investment Management Committee's duties include recommending individual investment and investment-related actions when required by the IPS or Board resolutions, recommending strategies for all TRS investments, setting investment objectives, performance and risk measurement, monitoring investment processes, monitoring overall fund investment performance, recommending appropriate reporting and communication protocols to keep the Board appropriately informed on investment matters, reviewing proposed new or amended investment policies and making appropriate recommendations to the Board Policy Committee.

- ***Are all investment-related policy statements easily accessible by the plan members and the public (e.g. posted to system website)?***

Conclusions

Yes, the IPS and Bylaws are posted on the TRS website. Additionally, there are TRS web-pages outlining and summarizing Investment Strategy, Beliefs, Diversification Framework, Risk Management, Making and Managing Investments. The TRS website also has dedicated web-pages for the following Investment Teams: Executive Leadership, Risk and Portfolio Management, Multi-Asset Strategies Group, Internal Fundamental Management, External Private Markets, External Public Markets, Strategic Partners and Research, Trading, Emerging Manager Program, Investment Operations and Legal & Compliance.

- ***How often are board meetings? How much time, detail, and discussion are devoted to investment issues?***

Conclusions

The Bylaws establish that the Board meets approximately five, but at least four, times per fiscal year. The dates for regular meetings are approved annually in advance by the Board at the first regular meeting of each fiscal year or soon thereafter.

The agenda for each meeting is set by the chairman of the Board and when appropriate other members in consultation with the executive director. Any Board member may submit items for inclusion on the agenda by submitting to the executive director by 5:00 pm no later than the tenth business day before the meeting. Agenda items may be added to a posted agenda by the chairman, the executive director, or by written request of any Board member provided the proposed addition is submitted in time to post the amendment in compliance with the Open Meetings Act.

The Board met five times in 2019. The Investment Management Committee met four times in 2019. The Board and Investment Committee agendas, board books, and minutes evidence there is a substantial, and appropriate, amount of time devoted to Investment matters given the size and sophistication of the Plan.

- ***Are minutes available for past meetings? How detailed are the minutes?***

Conclusions

The Bylaws provide that the minutes shall contain each subject of discussion and deliberation, all motions, seconds, and the vote of motions. Each Board member has the opportunity to record in the minutes his or her vote on a motion and the reasons stated in the meeting for his or her vote.

Our review of the minutes found them to be of excellent detail. Additionally, TRS is on the leading-edge of transparency, as it broadcasts open portions of its Board and committee meetings online and maintains past broadcastings of the meetings on TRS site. In addition to posting board agendas and minutes, TRS posts Board Meeting Packets (going back to 2013) with all supporting materials. TRS also posts Trustee biographies, a listing of Board Committees and Officers, Board of Trustee Ethics Policy, Board of Trustees External Communication Policy, and the Board Meeting Calendar.

Investment Knowledge/Expertise

- ***What are the backgrounds of the board members? Are there any investment-related educational requirements for board members?***

Conclusions

The Board is comprised of nine members and there are investment-related requirements for certain appointed members. According to Texas Government Code §825.002, the Governor, with the advice and consent of the Senate, appoints seven members:

- Three of the appointees must have demonstrated financial expertise, who have worked in private business or industry, and who have broad investment experience, preferably in the investment of funds
- Two of the appointees are selected by the Governor from a slate of three public school district candidates who have been nominated by employees of public school districts
- One of the appointees is selected by the Governor from a slate of retirees who have been nominated by retirees of the system
- One of the appointees is selected by the Governor from three “at-large” candidates who have been nominated for the position
 - Retirees of the system, members in public school districts and members in higher education institutions may run for nomination for the “at-large” position

Pursuant to Texas Government Code §825.003, the Governor also appoints two members, subject to confirmation by two-thirds of the Senate, from a list of nominees submitted by the State Board of Education. The members must be persons who have demonstrated financial expertise, have worked in private business or industry, and have broad investment experience, preferably in investment of pension funds.

Biographies of the current Board members are posted online on the TRS website.

- ***What training is provided and/or required of new board members? How frequently are board members provided investment-related education?***

Conclusions

Texas Government Code §825.0041 requires that a person who is appointed to the Board must complete a training program before taking office that includes information on TRS' enabling legislation and laws relating to open meetings, public information, administrative procedure, conflict of interest, ethics policies, TRS programs, function, rules, budget, and most recent formal audit.

New Board members go through rigorous orientation provided by TRS staff, which is typically a two-day orientation with tours of TRS divisions and follow up by TRS staff.

The Board orientation booklet is robust and follows best practices, with clear, unambiguous language and guidance. The main topics cover:

1. Organizational overview

- TRS Overview

- Trustees' Qualifications and Requirement for Holding Office

2. Roles and Responsibilities

- TRS Board of Trustees Qualifications, Roles, and Fiduciary Duties

3. Ethics and Health Insurance Portability and Accountability Act

4. Legal Governance and Administration

- Open Meetings Act

- Public Information Act

- Rulemaking

- Contested Case Appeal Process

5. Internal Audit

The booklet also provides new Board members with the following documents:

- Bylaws of the Board of Trustees
- Trustee Position Description
- Board of Trustees External Communications Policy
- Board of Trustees Ethics Policy
- Notice of Privacy Practices
- Policy Review Schedule
- Investment Policy Statement
- Proxy Voting Policy
- Securities Lending Policy
- Commission Credit Policy
- Procurement Policy
- Litigation Policy

- Summary Guidance on Trustee Travel
- Most recent CAFR

We were able to ask new Board members about their new trustee orientation and they confirmed that the orientation was thorough and helpful to their new roles as trustees.

Additionally, new members must complete approved, one-hour courses on Open Meetings and Open Records respectively within 90 days of taking the oath of office. Board members must also comply with the Texas Pension Review Board's Minimum Education Training requirements. New Board members must complete seven hours of training on assigned core topics within the first year of service. The core topic areas are fiduciary matters, governance, ethics, investments, actuarial matters, benefits administration, and risk management. After the first year, Board members are required to complete at least four credit hours of continuing education every two years. These four hours can be in either the core topics, or in non-core topics of compliance, legal and regulatory matters, pension accounting, custodial issues, plan administration, Texas Open Meetings Act, and Texas Public Information Act.

In addition to ensuring Board members complete and have these hours reported, TRS staff and outside advisors also provide education to the Board. The Board receives annual fiduciary education, and investment related education from outside advisors at Board meetings. The Board Bylaws also encourage Board members to attend workshops and training sessions on matters such as fiduciary duties, actuarial valuations, investment issues, and benefits delivery that will assist them in fulfilling their responsibilities. The Board also has a Board Training Policy. The purpose of the policy is to ensure that TRS Trustees receive training required by rule, statute, and law and have opportunities to obtain education and training on current and evolving issues, related to the general administration and operations of TRS, on an ongoing basis.

- ***Do the board members clearly understand their fiduciary responsibilities?***

Conclusions

Based upon our review of the fiduciary training materials, and interviews with Board members, we are confident that the TRS Board members have a solid understanding of their fiduciary responsibilities in serving as Trustees for the System.

- ***Does the board receive impartial investment advice and guidance?***

Conclusions

Based upon our review of Board meeting materials, reports, minutes, and interviews, we believe the Board receives investment advice and guidance from the CIO, the General Counsel, and IMD staff, but also receives impartial investment advice from their outside investment advisors, including outside fiduciary counsel to the Board and Board Advisors.

- ***How frequently is an RFP issued for investment consultant services?***

Conclusions

According to the TRS Board Procurement Policy, except as otherwise expressly authorized by the Board, contracts authorized by the Board, including investment advisors, may have an initial term not to exceed five (5) years in duration with one or more options for extensions not to exceed a total of two (2) years. The Board may authorize renewals or extension of agreements that are nearing their scheduled expiration dates without requiring a new acquisition process, provided the Board first determines that renewal or extension continues to provide the best overall value. The Procurement Policy also provides that a record of the process and rationale for vendor selection shall be maintained for each Board contracting opportunity.

Accountability

- ***How is the leadership of the board and committee(s), if any, selected?***

Conclusions

Texas Government Code Section 825.201 provides that the Governor of the State of Texas designates a member of the Board as the presiding officer of the Board to serve in that capacity at the pleasure of the Governor. The Bylaws provide that the chairman shall preside over meetings and perform such other duties as are assigned by statute, the Bylaws, or other action of the Board. The Board elects a vice chairman who must be a member of the Board and serves at the pleasure of the Board. In the case of absence of the chair or otherwise, the vice chair performs the duties of the chairman until the chairman resumes office or a successor has been appointed. In the case of absence of both the chairman and vice chairman, the Bylaws provide that the Board member with the longest service on the Board, as certified by the Executive Director, will be appointed as acting chair until such time the chairman or vice chairman has resumed or a successor has been appointed or elected.

The Board chairman designates the chairman of each committee. The board chairman appoints committee members annually subject to the consent of the Board.

- ***Is the current governance structure striking a good balance between risk and efficiency?***

Conclusions

We believe the degree of delegation exercised by the TRS Board is appropriate and in line with comparable peers and best practices given the size and complexity of TRS. As recognized by Trust law and the Uniform Prudent Investor Act of 1994 (UPIA), trustees have a duty to personally perform the responsibilities of a trustee except as a prudent person might delegate those responsibilities to others. In deciding whether, to whom and in what manner to delegate fiduciary authority in the administration of a trust, and thereafter in supervising agents, the trustee is under a duty to beneficiaries to exercise fiduciary discretion and to act as a prudent person would act in similar circumstances. Restatement (Third) of Trusts, §227.

Trustees cannot be expected to perform all of the duties required to properly manage the massive size of public pension fund assets. What they can do, as TRS has done, is appropriately delegate those responsibilities to those who have the required expertise, clearly delineate the scope and parameters of those delegations, and monitor and demand accountability.

In 2017, AHIC Fiduciary Services compared a group of 13 public pension funds to see the level of delegation for 12 key functions. TRS was part of this group. Of the 13 funds, most boards

retained authority for the IPS, asset allocation, permissible asset classes, performance benchmarks, and selection of investment consultants. Somewhat delegated functions include number of managers in each asset class, active v. passive management, and internal versus external management. Frequently delegated duties are selection and termination of investment managers, criteria for manager searches, investment manager/service provider due diligence, drafting RFPs and reviewing manager/service provider responses, ongoing manager monitoring, documentation of transactions, and meeting with managers/periodic due diligence visits.

Investment Responsibility	Sole Fiduciary	Board		Finance / Investment Committee		CIO		Other Staff		Consultants	
	Final	FINAL	ADVISORY	FINAL	ADVISORY	FINAL	ADVISORY	FINAL	ADVISORY	FINAL	ADVISORY
Investment Policy	16.7%	58.3%	0.0%	8.3%	25.0%	16.7%	66.7%	0.0%	33.3%	0.0%	66.7%
Asset Allocation and Risk Tolerance	16.7%	58.3%	0.0%	8.3%	25.0%	16.7%	66.7%	0.0%	33.3%	0.0%	66.7%
Permissible Asset Classes	16.7%	58.3%	0.0%	8.3%	25.0%	16.7%	66.7%	0.0%	33.3%	0.0%	66.7%
Performance Benchmarks	8.3%	58.3%	0.0%	8.3%	25.0%	25.0%	66.7%	0.0%	33.3%	0.0%	75.0%
Selection of Consultants	8.3%	50.0%	0.0%	8.3%	8.3%	33.3%	58.3%	0.0%	33.3%	0.0%	33.3%
Selection of Investment Managers	8.3%	16.7%	0.0%	8.3%	8.3%	50.0%	33.3%	16.7%	41.7%	0.0%	41.7%
Termination of Investment Managers	8.3%	16.7%	0.0%	0.0%	16.7%	58.3%	25.0%	16.7%	41.7%	0.0%	33.3%
Specific Mandates/Allocations to Each Manager	8.3%	16.7%	0.0%	8.3%	8.3%	50.0%	25.0%	16.7%	33.3%	0.0%	33.3%
Selection of Private Equity Funds	8.3%	16.7%	0.0%	8.3%	8.3%	50.0%	25.0%	16.7%	33.3%	0.0%	41.7%
Selection of Real Estate Funds	8.3%	16.7%	0.0%	8.3%	8.3%	50.0%	25.0%	16.7%	33.3%	0.0%	41.7%
Internal vs External Management	8.3%	33.3%	0.0%	0.0%	8.3%	50.0%	33.3%	8.3%	33.3%	0.0%	33.3%
Active vs Passive Management	8.3%	33.3%	0.0%	0.0%	8.3%	50.0%	41.7%	8.3%	33.3%	0.0%	41.7%

Yellow: Board Retains; Blue: Board delegates; Green: Board sometimes retains

TRS delegation is in line with peer plans in the study.

A 2019 CEM Benchmarking Governance survey reviewed strategic and investment decisions of 23 global leaders relative to delegation. The survey indicated that overall, TRS delegated less approval authority than most peers, and responsibility to lead the development of recommendations about as much as peers.

We believe the governance structure is in line with best practices of a fund the size and complexity of TRS. The Board establishes policy and ensures appropriate monitoring, reporting, and accountability of its policies. Staff is able to appropriately implement the Board's directives within the parameters set by the Board. The policies, procedures, practices, and interviewees' commentaries all support a strong, stable governance framework for TRS to fulfill its mission and purpose.

- ***What controls are in place to ensure policies are being followed? How often are the investment governance processes reviewed for continued appropriateness?***

Conclusions

The Audit, Compliance, and Ethics Committee is responsible for, among other duties, assisting the Board in fulfilling its fiduciary oversight responsibilities for the risk management and internal control system, the internal audit process, the process for monitoring compliance with laws, regulations and policies, and reporting and other activities. This Committee receives reports on the internal and external auditors' assessment of the effectiveness of the organization's governance, risk management, and internal control activities, including technology governance and fraud risk prevention activities. The Committee also receives any reports on any violations of portfolio risk management standards as required by the IPS for any passive violation of prescribed portfolio policy limits as a result of changing market or credit conditions and any active violation as a result of entering into an agreement or investment that breaches a policy limit at inception and the corrective action plan implemented to cure such violation. The Committee also assesses TRS' effectiveness of monitoring compliance with laws, regulations and policies, and the results of TRS management's follow-up actions pertaining to any reported instances of noncompliance. The Committee obtains regular reports and updates from the Chief Compliance Officer ("CCO"). The Committee reports at least quarterly to the Board and reviews and assesses the adequacy of its assigned duties under the Bylaws at least every four years.

Pursuant to the Bylaws, the Policy Committee makes and reviews policy proposals, and recommends new written Board policies and modifications to existing written policies as needed. The Policy Committee adopts and follows a plan of review for each fiscal year to ensure that all written TRS policies are reviewed periodically and ensures that proposed changes have been appropriately reviewed by staff or consultants as necessary. According to the adopted schedule, the Investment Policy Statement and General Authority Resolution are reviewed every two years, and the Proxy Policy, Securities Lending Policy and Commission Credits Policy are reviewed every three years. Over recent periods the IPS was reviewed in 2019, 2018, and 2016. Additionally, the ancillary policies (Commission Credits Policy, Proxy Voting Policy, and Securities Lending Policy) have each been reviewed multiple times over the same time period.

The IPS authorizes the CCO to execute and deliver compliance related disclosures, reports, filings, certifications, and with the Executive Director and CIO's approval, to develop, disseminate and collect disclosure forms to monitor IPS requirements. The CCO is housed within the TRS Legal & Compliance department, and in coordination with TRS Internal Audit Department, has full transparency and access to investment processes and performs ongoing monitoring of IMD and IIC activities. TRS Investment Compliance, through the CCO, Investment Compliance Specialists, with the assistance from State Street Bank's ("SSB") Compliance Services and IMD Operations, performs daily monitoring of certain IMD functions to determine compliance with the IPS, Securities Lending Policies, Proxy Voting Policy, and TRS Personal Trading Policy. SSB runs daily checks on compliance requirements and provides reports on Asset Allocation, Counterparty Limits, Leverage, Currency Overlay, and External Manager Compliance.

After adoption of any changes to the IPS, SSB provides a gap analysis of any required modifications to the compliance monitoring system as a result, which is reviewed by Investment Compliance and IMD Operations before final changes are implemented by SSB. There is rigorous documentation and processes to support these changes including a Compliance Dictionary and Formula Matrix developed in coordination with SSB. The documents allow TRS to replicate the data inputs, formulas and operation of the tests performed by SSB, as well as confirming that the new automated rules programed in the SSB software correctly reflect the policy guidelines. Internal Audit also performs an audit of SSB's formulas and calculations on a

three to four year cycle. Additionally, certain members of IMD senior management and TRS Legal & Compliance quarterly certify they are not aware of any compliance issues. The manual and automated compliance tests are highly sophisticated and evidence best practices in this area. Investment Compliance reports any violations of the IPS or related policies to the Board on a quarterly basis. The Chief Risk Officer provides a semi-annual Investment Risk Report for the Board. The compliance framework is structured to ensure all required information is being reported to the Board, ensures that new investments are made within delegated limited and established criteria, that risk limits are being followed, and that there is ongoing monitoring. There are established rules and reporting of any non-compliance with investment-related policies to the Board Audit, Compliance, and Ethics Committee. There is also staff orientation and on-going online and in person training on compliance policies, including the Employee Ethics Policy, the Fraud Waste and Abuse Policy, and the Personal Trading Policy.

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Evaluation Component 5.



Evaluation Component 5.

A review of the retirement system 's investment manager selection and monitoring process.

- ***Who is responsible for selecting investment managers?***

Conclusion

It is ultimately the responsibility of the IIC to review, consider, and authorize proposed investments and external manager selection (within the guidelines set forth in the Plan's investment policies). The IIC also reviews new internally managed investment strategies, but this process is not outlined in the IPS. An affirmative vote of the majority of IIC members in attendance is required to approve any action. The CIO and Executive Director (with consultation from the CIO) have veto power over any investment or delegation of investment discretion authorized or recommended by the IIC. The CIO, Executive Director, or a Board member may request a prudence letter for any external investment opportunity presented to the IIC. A Board member may have any external investment opportunity scheduled for consideration by the IIC be submitted for Board consideration.

- ***How are the managers identified as potential candidates?***

Conclusion

For public market, private market, and risk parity candidates, teams will utilize all their available resources to come up with a list of potential managers that warrant further due diligence. Examples of these resources include discussions with existing managers, outreach from managers not currently invested with, opportunities learned through discussion with industry professionals or at industry conferences, and outside resources such as eVestment/PitchBook/etc. or investment consultants/advisors.

Potential candidates that manage less than \$3 billion in assets, manage Fund IV or less, or have a performance track record shorter than 5-years are eligible for inclusion within the Emerging Manager Program ("EMP"), which invests in multiple investment strategies, includes private equity, real estate, and public market strategies. Investment opportunities are identified through a variety of channels that include existing advisor relationships, TRS staff, and through the TRS emerging manager website.

- ***What are the selection criteria for including potential candidates?***

Background

External Public Markets ("EPU")

Beginning the selection process, EPU and IMD management continually monitor the Plan and each investment area to determine the most suitable allocation to asset classes, strategies, and sub-strategies. If it has been determined that a new strategy should be included in the Plan, the EPU team will begin developing a list of target managers and schedule initial due diligence with the manager/strategy including introductory visits and phone calls. If the team has identified a manager that they feel strongly towards, they will begin the "Premier List" development process.

Once the Premier List (“PL”) process has begun, EPU sends the manager the “Texas Way” presentation giving them an overview of TRS and the EPU selection process, as well as an outlined fee alignment. An EPU team member will gather initial marketing/intro documents from the manager as well as returns for the investment manager. Once the manager has reviewed the documentation, EPU will determine to move forward with the manager or decline. If the decision is to move forward, conference calls and in-person meetings will be scheduled for additional information gathering. Once all relevant material is gathered the EPU team will discuss whether the manager should be added to the PL. A Tear Sheet is produced for the manager’s strategy which includes the rationale for adding it to the PL. A PL candidate is brought in front of the CIO which meets twice a year to formally include the manager on the PL. If the CIO approves adding the manager to the PL the EPU team will initiate high level legal and financial terms negotiations.

When starting the legal and financial term negotiations the manager will confirm that the terms of the strategy are consistent with TRS goals, considering such matters as fund structure (limited liability or separate account), liquidity terms, transparency levels, and willingness to accept TRS non-negotiable terms (sovereign immunity, jurisdiction). Within this process, the EPU team will negotiate fee structure and push for fee alignment through performance fees rather than management fees. Once the EPU team is comfortable with the terms they will proceed to the certification process.

To begin the external manager certificate process, the EPU team will send out a certification questionnaire to the manager, conduct on-site visits and often in-person meetings at TRS, and perform reference checks on the manager. The EPU team uses this information to understand and analyze the details of a prospective manager to formalize a write up including the below information;

1. Organization
2. Investment process
3. Portfolio exposure
4. Risk management
5. Diversification impact
6. Investment terms
7. Operations
8. Transparency
9. Performance

The write-up is used to communicate the potential investment to the IIC.

After the certification process, EPU conducts a risk analysis to determine a potential manager's risk exposures, environment tilts, and correlations. These metrics are then evaluated against the entire portfolio as well as the strategy specific level. If the manager is not a good fit for the existing portfolio, they will be certified on "the bench" for future investment. If EPU decides to move forward with a manager, they will request a risk certification from the Risk group. The Risk group conducts additional due diligence on the manager and provides a risk certification write-up which includes the below areas of focus;

1. Market factors
2. Leverage
3. Drawdown history
4. Liquidity
5. Risk management systems
6. Audit history

If the manager is determined to be a good fit in the portfolio, EPU will proceed to a final fit analysis.

The final fit analysis includes an evaluation of the proposed manager's ability to improve the risk/reward profile of the Plan, as well as determine the optimal/initial sizing of the new manager. If the manager continues to be determined as a good fit, the EPU team will proceed with pre-IIC negotiations with the manager.

Prior to bringing a manager to the IIC, IMD will ensure the manager's ability to come to an agreement on the below issues;

1. Fees
2. Benchmarks
3. Hurdles
4. Liquidity terms
5. Transparency

Once these issues have been agreed upon EPU will proceed to recommending the manager to the IIC via a formal write-up. The IIC write-up includes the same 9 elements of the certification process. Documentation of due diligence in those 9 areas are outlined in a certification checklist, which is included in the body of the IIC write-up. In addition, consultant reports and the risk certification are included. Once the documents are finalized, all necessary attestations are obtained, including those from the lead Portfolio Manager, Portfolio Director, and Director of EPU. The documents are then delivered to the IIC members 1 week prior to the meeting to generate questions, comments, and concerns. At the IIC meeting, the investment manager is presented and proposed for inclusion in the portfolio subject to the final vote of the committee.

External Private Markets

The due-diligence and underwriting process for the private markets group is similar to that of the external public markets group. It includes many of the same analysis in a different format. Private markets also heavily negotiates legal terms, governance, and fees. Private markets typically will require participation or a seat on the Fund's advisory board. All additions to the Premier List are reviewed and approved by the team Investment Committees.

Emerging Manager Program

TRS has delegated to Rock Creek (public markets) and Grosvenor Capital Markets (private markets) to invest on behalf of the Trust for their EMP as they see fit. TRS does not make investment decisions within the program but reserves the right to opt-out of any investment. TRS regularly meets with the two advisors to discuss and review pipeline and upcoming proposed investments. Any proposed investment is communicated with a formal Investment Memo that is reviewed by the EMP team along with a designee from the either the public markets, private equity, or real assets group. Formal documentation is signed in the event that IMD wishes to opt-out of any investment.

- ***What are the selection criteria when deciding between multiple candidates?***

Conclusions

The process for selecting an investment manager is outlined in the previous question. Selecting between multiple candidates is often the result of what mandate most efficiently provides the exposure desired and represents the best fit within the Plan. More detail on the process is outlined in the previous response.

- ***How does the selection process address ethical considerations and potential conflicts of interest for both investment managers and board members?***

Conclusions

As part of the manager diligence process the IMD performs a legal review which evaluates ethical considerations and potential conflicts of interest for both investment managers and board members. IMD also commissions third-party background checks for new investment managers. External investment managers must comply with the TRS Code of Ethics for Contractors, which requires a signed written acknowledgement of the responsibilities and obligations upon commencement of the contract and annually thereafter, an annual Disclosure Statement for Financial Services Providers, and a new or amended Disclosure when required. To help ensure all investment decisions and recommendations are free of potential conflicts of interest, external investment managers must complete an Investment Integrity Disclosure (form included in the IPS). The disclosure reports whether a Placement Agent has been involved and any political contribution or Placement Fee. The disclosure also reports the relationship of the recipients to the Placement Agent, Texas Elected Official, or Candidate.

- ***Who is responsible for developing and/or reviewing investment consultant and/or manager contracts?***

Conclusions

Under the direction of TRS General Counsel, internal legal counsel manages external legal counsel and reviews the material terms of all investment transaction deals. Internal and external legal counsel advise the IMD on those terms in accordance with fiduciary principles. According to Texas Government Code §825.203 and §402.0212, the Texas Attorney General approves contracts with external legal counsel. TRS General Counsel works diligently with the Attorney General's Office to ensure the System retains firms with the required expertise with respect to investment-related transactional reviews.

- ***What is the process for monitoring individual and overall fund performance?***

Background

Individual public asset managers are evaluated on a continuous basis. On a monthly cycle quantitative analysis is produced and distributed by the Analytics Group and is reviewed by the assigned investment manager and analyst. Each invested manager is assigned both primary and backup coverage. Examples of monthly monitoring materials include the following;

1. Portfolio performance reports
2. STAR reports
3. PARMA Reports (holdings-based risk analysis)
4. Portfolio Characteristics (Pubdoc)

In addition to the above, the Risk group produces monthly risk alarms which are delivered to the external manager teams. If the Risk group identifies a risk anomaly, it is the responsibility of the external manager staff to formulate a written response to deliver back to the Risk group. In the event of a CUSUM (cumulative sum) alarm, which is an alarm to track how well a manager achieves desired returns, the external manager team will re-underwrite the investment and decide to either add funds or terminate the investment. As a result of the re-underwriting process, a formal CUSUM response is required back to the Risk group within 60 days. All CUSUM alarms are also reported to the management committee.

Across public and private external asset managers, IMD conducts conference calls on a quarterly basis as part of its ongoing diligence. These calls include a discussion of portfolio performance and risk, as well as any organizational changes that may have occurred or will incur in the future. Among the private asset managers, the calls also include a review of recent capital calls. Staff targets to meet with managers in person at least twice a year with a preference to once being on-site at the managers location.

In addition to the manager diligence outlined above for the private market portfolio, the team also performs a semi-annual portfolio review. This includes a structural review of the portfolio relative to desired positioning and the opportunity set, as well as quantitative evaluation of the private asset managers.

Additionally, the Board receives investment performance updates on a monthly and quarterly basis from the IMD and receives an investment performance report from its independent investment consultant at each quarterly board meeting.

- ***Who is responsible for measuring the performance?***

Conclusions

The Plan's custodian (State Street) is responsible for measuring and calculating investment performance.

- ***What benchmarks are used to evaluate performance?***

Conclusion

The table below outlines the Plan benchmark as of December 31, 2019.

Total Fund Benchmark Components	Weight (12/31/2019)
MSCI U.S.A IMI*	18.5%
MSCI EAFE + Canada Index*	13.2%
MSCI Emerging Markets Index*	9.0%
State Street Private Equity Index (1Q Lag)	14.7%
Bloomberg Barclays Long-Term Treasury Index	14.9%
HFRI Fund of Funds Conservative Index	5.0%
NCREIF-ODCE Index (1Q Lag)	13.7%
40% Cambridge Natural Resources/40% Cambridge Infrastructure/20% quarterly CPI (1Q Lag)	5.7%
HFR Risk Parity Vol 12 Institutional Index	8.0%
Citigroup 3 Month Treasury Bill Index	2.0%
3 Month LIBOR (1Day Lag)	-4.7%

*Benchmarks will be adjusted for securities TRS is not authorized to own or buy because of this Policy or statutory provisions for which no fiduciary exemption has been exercised

Below are all the manager benchmarks which are included in the quarterly investment performance reports.

Manager Benchmarks	
3-month LIBOR + 200 basis points	MSCI EAFE + Canada (Net)
Bloomberg Barclays Global Inflation Linked Bond Index	MSCI Emerging Markets Index
Bloomberg Barclays High Yield Index	MSCI Europe (Net)
Bloomberg Barclays Intermediate Gov/Credit Bond Index	MSCI Japan (net)
Bloomberg Barclays Long Term Treasury Index	MSCI US Growth Index
Bloomberg Barclays U.S. TIPS Index	MSCI US Small Cap Index
Cambridge Associates Natural Resources	MSCI US Value Index
Citigroup 3-Month T-Bill Index	MSCI USA IMI
Dow Jones U.S. Total Stock Market Index	MSCI World Index (net)
Goldman Sachs Commodities Index	NAREIT Index
HFRI FoF Conservative Index	NCREIF ODCE Index
HFRI Fund of Fund Composite Index	NCREIF Property Index
MSCI AC World Index (Net)	Consumer Price Index (1 quarter lagged)
MSCI All Country World Index	Russell 2000 Index
MSCI Asia ex-Japan (net)	Russell 2000 Value Index
MSCI China A	State Street Private Equity (1 quarter lagged)

- ***What types of performance evaluation reports are provided to the board? Are they provided in a digestible format accessible to trustees with differing levels of investment knowledge/expertise?***

Background

The Board is receiving performance evaluation in multiple ways. These documents vary in detail and investment acumen required to digest the provided information. There are three prominent ways in which the Board is receiving performance evaluation reports;

1. Monthly performance updates from IMD via Transparency Reports
2. Quarterly performance update from the Board's Advisor
3. Presentations made by IMD at quarterly meetings providing updates on the Plan

Reports

Monthly documents received by the Board which highlight;

- Investment results of the Plan, asset classes, and underlying investment managers
- Update on the capital markets
- Plan asset allocation relative to the strategic target
- IIC approvals during the period
- IIC meeting agenda and minutes for upcoming meetings
- Diligence documents for managers discussed by the IIC
- Additions, Withdrawals, Terminations, or Transfer detail
- Vintage summary of private investments
- Other types of governance reporting

These reports span the spectrum of investment acumen required to fully digest the provided information. Manager diligence reports are likely intended for Board members with sufficient knowledge/experience to consume them. Standard performance updates are presented in a way in which the information can be accessible to all Board members.

Quarterly Performance Reports

The investment report provided to the Board as of September 30, 2019 was 15 pages of content (excluding appendices). Within these pages, the Advisor report reviews;

- Historical performance of the capital markets
- Financial reconciliation of the Plan over trailing periods (beginning market value, additions/withdrawals, investment earnings, and ending market value)
- The asset allocation of the Plan relative to the interim policy target, long term policy target, and policy ranges
- Trailing investment results of the Plan (net of investment management fees) relative to the primary benchmark
- Performance attribution for the trailing quarter and 1-year period
- Risk-adjusted investment results of the Plan relative to the benchmark and peers over a trailing 3-year and 5-year period
- Trailing investment results of the underlying asset classes (net of investment management fees) relative to their respective benchmarks

The report provided to the Board is detailed yet digestible for Board members of various levels of investment knowledge and expertise. Given the opportunity for further discussion and dialogue at the quarterly meetings, we find these reports to be appropriate in terms of meeting the Board's needs.

IMD Presentations

IMD frequently presents to the Board to provide updates on the positioning and performance of the Plan as well as underlying asset classes. IMD stated their objective is to provide the IMC an overview of each team and asset class annually. While these presentations tend to vary based on topic, they typically include;

- An overview of the team
- Overview of the portfolio
- Performance and asset allocation of the area being discussed
- Thesis for alpha generation
- Team updates
- Overview of investment processes
- Forward looking ideas and future priorities

These presentations are typically intended to be understandable to stakeholders watching the presentation as well as the full Board. Based on our opportunity to observe these presentations, we believe they are presented in a manner which focuses on transparency without becoming overly complex.

Conclusions

The types of performance reports provided to the Board are many and have been outlined above. We believe that the reports are appropriately formatted and presented to allow Board members of all investment acumen and expertise to evaluate the investment success associated with the implementation of the investment policy. Given the complex nature of the topic, and the TRS investment program, the additional opportunity to discuss performance with IMD and the Board's Advisor further alleviates any concern that the reports are overly complex.

- ***How frequently is performance reviewed?***

Conclusions

As outlined in the response related to the process for monitoring individual and overall fund performance, performance is reviewed by IMD in a continuance manner, and reviewed by the Board on a monthly and quarterly basis.

- ***Are fees considered when reviewing investment performance?***

Conclusions

Yes, Investment management fees are considered when reviewing investment performance. Two ways where this dual comparison is most obvious include;

- Reviewing of Investment Results – All investment results reported to the Board by the Advisor and IMD are net of external investment management fees
- Review of the CEM Benchmarking Report – The CEM Benchmarking report provides a thorough review of the investment expenses of the Plan as well as the net of fee investment results of the Plan relative to peers

By receiving investment results net of all investment management fees, the Board is ensuring that they are fully considering investment management fees when evaluating the success of implementing the investment policy.

- ***What is the process for determining when an investment manager should be replaced?***

Conclusions

Through our discussions with IMD it was communicated to us that the process for deciding to terminate a manager is ultimately the inverse of the thought process articulated for retaining an investment manager. Catalysts for deciding to terminate an investment manager include, but are not limited to;

- Determining that the original case for alpha generation has eroded over time, or eroded given some catalyst
- Organizational disruption
- Failure to manage investment risk as expected
- The strategy is no longer appropriate for the portfolio
- IMD has determined that they can implement the strategy internally
- The investment strategy has proven to be less diversifying to the portfolio than originally believed
- Tail risks within the strategy have been identified
- The strategy has been managed in a way that deviates from the articulated process

The decision to terminate an investment manager may come from the CIO or Deputy CIO. Additionally, within Public Markets the Head of Public Markets or the Chief Risk Officer may terminate an investment manager. Within Private Markets the heads of Private Markets, Private Equity, Real Estate, or Energy, Natural Resources and Infrastructure (as applicable) may terminate an investment manager.

- ***How is individual performance evaluation integrated with other investment decisions such as asset allocation and investment risk decisions?***

Conclusions

As part of the IPS, the Board has established tracking error targets and maximums. In implementing the strategic asset allocation IMD monitors forward looking and historical tracking error of the underlying investment managers as well as compliance with the Plan's risk targets. To the extent that an investment mandate contributes active risk levels inconsistent with its historic trend or expectation, the strategy is flagged for further review and consideration. The risk team works to manage and monitor forward looking risk positions based on trend history and the interaction between the different investment mandates and asset classes.

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Appendix A – Documents Reviewed



Appendix A – Documents Reviewed

AHIC submitted a detailed document request. Listed below are descriptions of the documents that were provided by staff in response to the document requests and in response to follow-up information requests. The documents were reviewed by AHIC.

TRS enabling statute and related constitutional and other statutory provisions
Rules and regulations governing TRS
TRS website
Board and committee meeting agendas, minutes and board books
Board member biographies
List of standing board committees and their membership
Board Bylaws
Schedule of Policy, Authority and Bylaws Review
Investment Policy Statement
Performance Reports
List of all benchmarks and universes used
List of total fund policy allocations
CEM studies
Trading cost reports
Funding Policy
External Manager Critical Processes, Texas Way
TRS Hedge Fund Fee Philosophy
TRS External Public Markets Strategy & Manager Selection
Investment Manager Fees for the Period Ended June 30, 2019
Investment Manager Fees for the Period Ended June 30, 2018
TRS Investment Accounting Policies and Procedures Manual, Updated July 2019
TRS Payment of Management & Incentive Fees Procedures
October 2019 Management and Performance Fee Review
Master Investment Advisory Services Agreement
Fee Conciliation-Process Guides
Investment Management Committee-Recommendation Memorandums
Investment Cost Effectiveness Analysis for the 5-year period ending December 31, 2018
Investment Cost Effectiveness Analysis for the 5-year period ending December 31, 2017
Post-Trade TCA TRS Quarterly Report, Third Quarter 2019
Post-Trade TCA TRS Quarterly Report, Fourth Quarter 2019
Performance Payment Plan
Securities Lending Policy
Proxy Voting Policy
Commission Credits Policy
Internal Investment Committee Procedures and Guidelines
FY 2020 Quarterly TRS Compliance Testing Plan
Investment Policy Statement Gap Analysis
State Street Weekly Compliance Summary and Underlying Reports
Investment Compliance Narrative
New Trustee Orientation Schedule

Trustee Orientation Materials
Board Procurement Policy
TRS Commission Credits Guidelines FY2020
State Street Performance & Analytics TRS Performance Audit February 2018
TRS External Private Markets Due Diligence and Monitoring Guidelines
TRS Private Equity Strategy
TRS External Manager Program Investment Recommendation
Sample Limited Partner Advisory Committee Meeting December 2019
Sample Limited Partner Advisory Committee Meeting Agenda and minutes
Sample Limited Partner Advisory Committee Materials
Sample Limited Partner Quarterly Funds Update
Sample Limited Partner Update
Sample Limited Partner Alternative Markets Monthly Letter
Sample Limited Partner Quarterly Commentary
Sample Limited Partner Strategy Notes
Quarterly Board Transparency Report, January 2019
Monthly Board Transparency Report, February 2019
Monthly Board Transparency Report, March 2019
Quarterly Board Transparency Report, April 2019
Monthly Board Transparency Report, May 2019
Monthly Board Transparency Report, June 2019
Quarterly Board Transparency Report, July 2019
Monthly Transparency Report, August 2019
Monthly Transparency Report, September 2019
Quarterly Transparency Report, October 2019
Monthly Board Transparency Report, November 2019
Monthly Board Transparency Report, December 2019
Alternative Investment Narrative
Emerging Manager Program Narrative
TRS Fair Valuation Pricing Guidelines, Updated September 2018
TRS Risk Diligence Process Map
TRS Narrative Process to Terminate Investment Manager
Sample Notice of Termination of Investment Period
TRS Code of Ethics for Contractors

Appendix B – Interviewees



Appendix B – Interviewees

For this review, AHIC interviewed the following individuals:

TRS Investment Management Committee Board Members

David Corpus
Jarvis V. Hollingsworth
Christopher Moss
Robert H. Walls

TRS Staff

Jase Auby, Chief Investment Officer
Sylvia Bell, Chief Operating Officer, Investment Management Division
Katy Hoffman, Chief of Staff, Investment Management Division
Scott Leith, Director of Investment Accounting
Mohan Balachandran, Senior Managing Director of Asset Allocation
James Nield, Chief Risk Officer, Risk and Portfolio Management
Matt Talbert, Senior Investment Manager-Multi-Asset Strategies and Asset Allocation
Dale West, Senior Managing Director of Public Markets
Brad Gilbert, Senior Director of Hedge Funds
Steven Wilson, Senior Investment Manager, Public
Eric Lang, Senior Managing Director of External Private Markets
Kaitlin Miles, Investment Manager-Private Markets
Carolina de Onis, General Counsel
Heather Traeger, Chief Compliance Officer